DECEMBER 1956
VOL. LI NO. 12

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VETERINARY Medicine

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features in this issue...

Phenothiazine as a Means of Controlling Gastrointestinal Parasites in Calves

Immunization of Horses Against Leptospirosis

Incidence of Hog Cholera in Iowa and Studies Made on Current Field Problems

Moniliasis as a Systemic Infection in Cattle

Magnets in the Treatment of Traumatic Gastritis

The Health Department's Role in Promulgating a Brucellosis Law

Clinical Spinal Conditions of the Dog

Oral Use of a New Antibiotic in Dogs and Cats

Promazine in Small Animal Practice

A.V.M.A. San Antonio Convention

Volume Index for 1956

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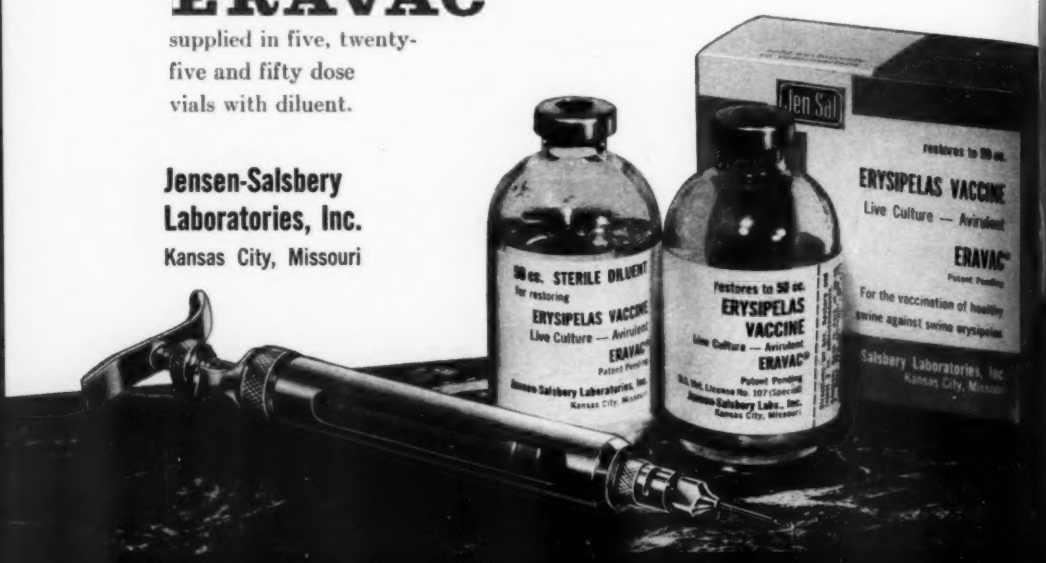

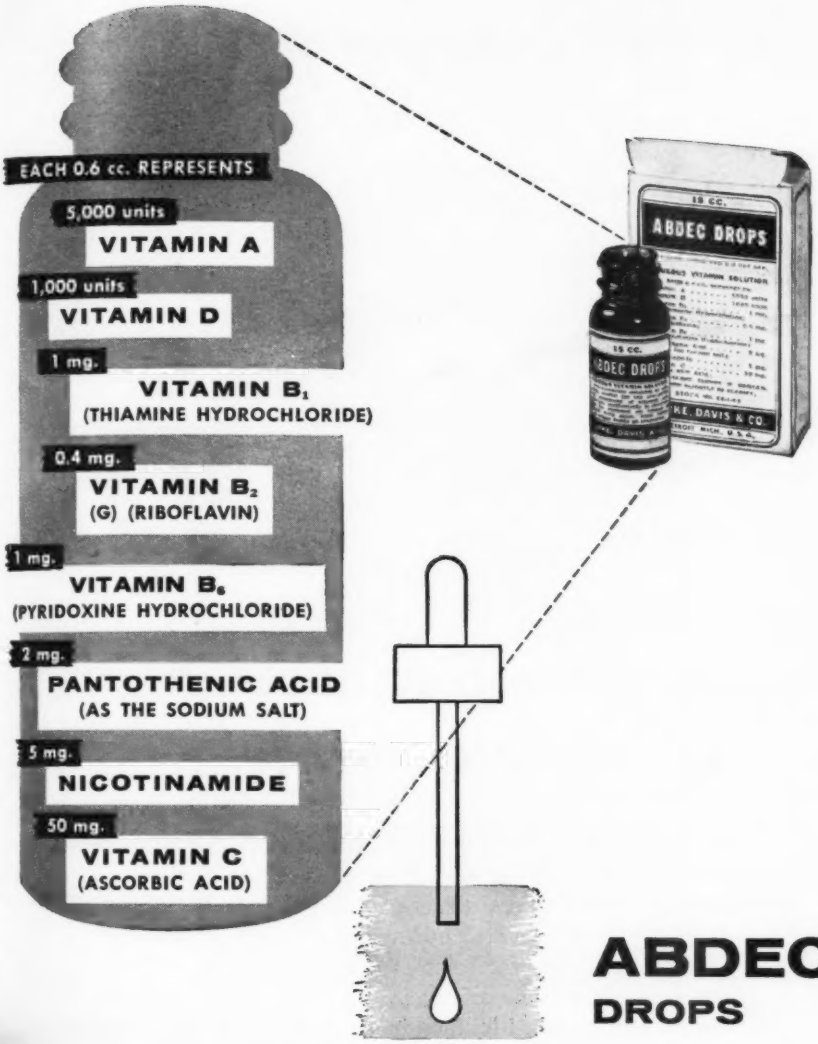

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In view of the obvious need to define the position of veterinary practitioners in public health practice and the relation of these professionals to other disciplines, the School of Public Health of the University of Michigan, Ann Arbor, has announced through its office of Continued Education Services the First National Institute on Veterinary Public Health Practice.

Plans now schedule the Institute for early 1957 in collaboration with the American Veterinary Medical Association, the American Board of Veterinary Public Health, the Conference of Public Health Veterinarians and the Training Branch, Communicable Disease Center, U. S. Public Health Service.

The objectives of this Institute are to explore the more expeditious use and function of veterinarians as practitioners and as employees of official and voluntary health agencies. Tentatively, a well indexed volume will be published which should fulfill several useful purposes, including documentation of current and projected concepts of veterinary public health practice. Five Committees have been selected who have been assigned development of various phases of the project which gives promise of having far-reaching influence on the position of veterinary science in modern society.

Every professional service a practitioner of veterinary medicine performs has intrinsic public health character. Whether this service is inspection of meat food products to assure against food-borne diseases, prophylactic treatment of animals to prevent communicable diseases, enforcement of sanitary and hygiene measures, or merely conservation of food, it has public health significance. Documentation to define the present utilization of veterinarians on the public health team and their potential for such service may well revolutionize public concepts of the contributions of the discipline to public health and society. For this reason the efforts of the Institute should be of interest to every veterinarian.

VETERINARY Medicine

Established 1905

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A Monthly Magazine Devoted to the Promotion of the Art and Science of Veterinary Medicine

Vol. LI DECEMBER 1956 No. 12

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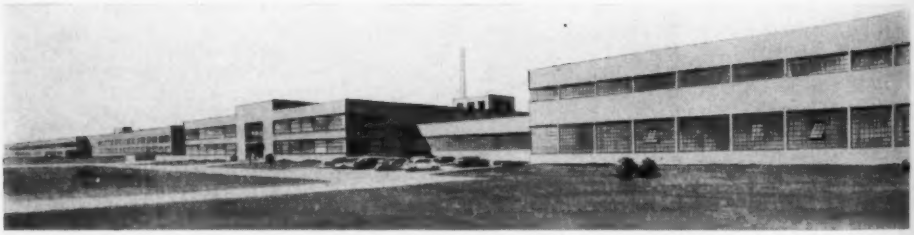

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(1) R. J. Deans, W. J. Van Arsdell, E. P. Reineke and L. J. Bratzler (Michigan Agricultural Experiment Station): The Effect of Progesterone-Estradiol Implants and Stilbestrol Feeding on Feed Lot Performance and Carcass Characteristics of Steers, *Jl. of Animal Science* (In Press).

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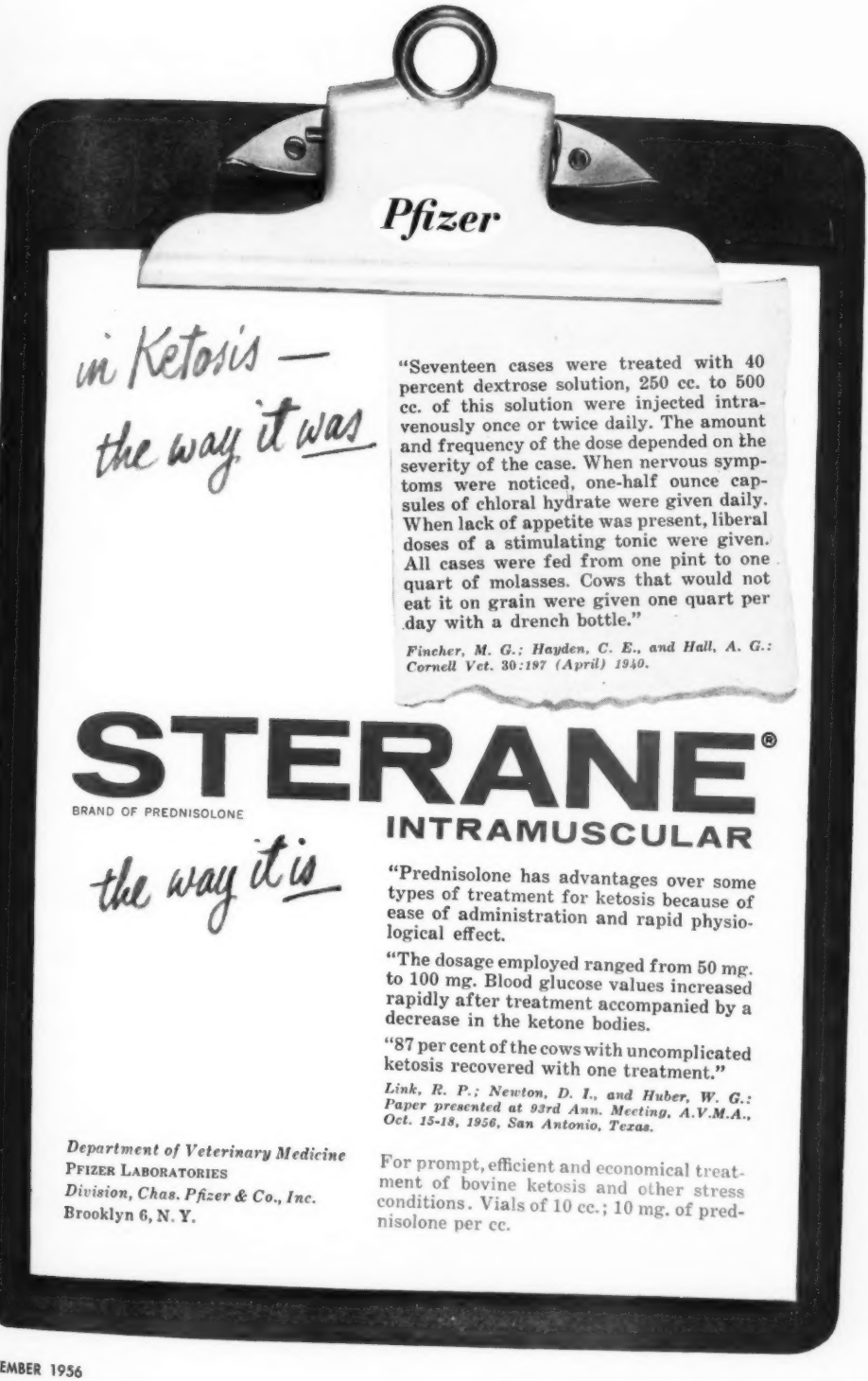
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Fincher, M. G.; Hayden, C. E., and Hall, A. G.: Cornell Vet. 30:187 (April) 1940.
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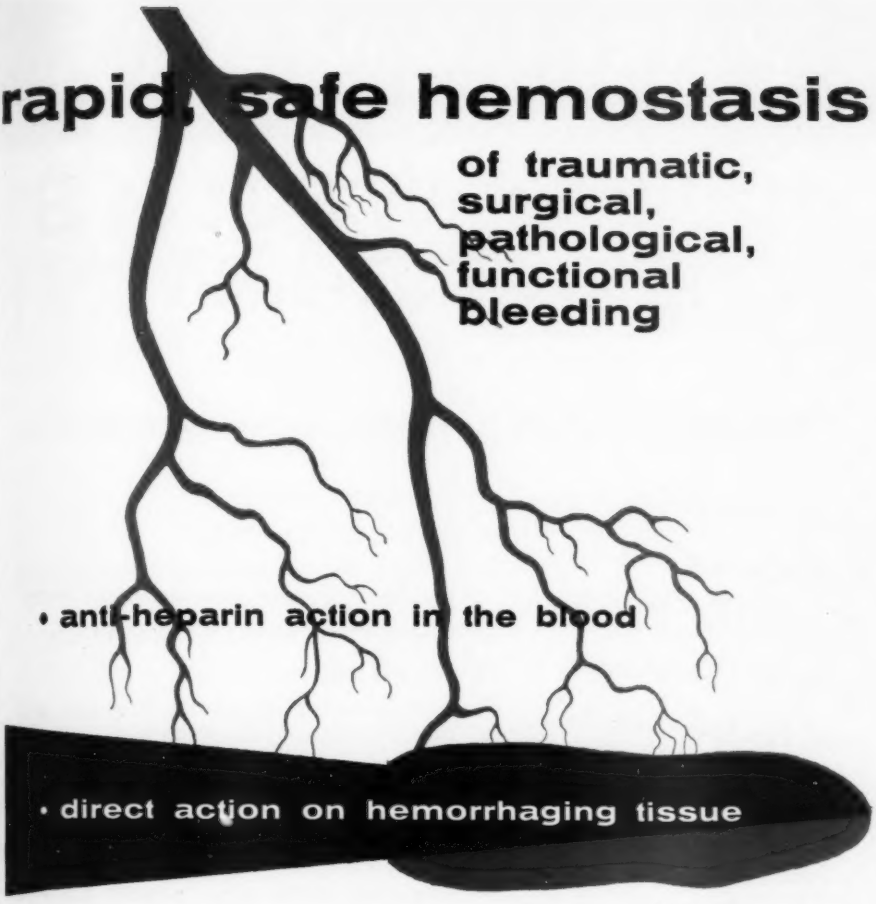

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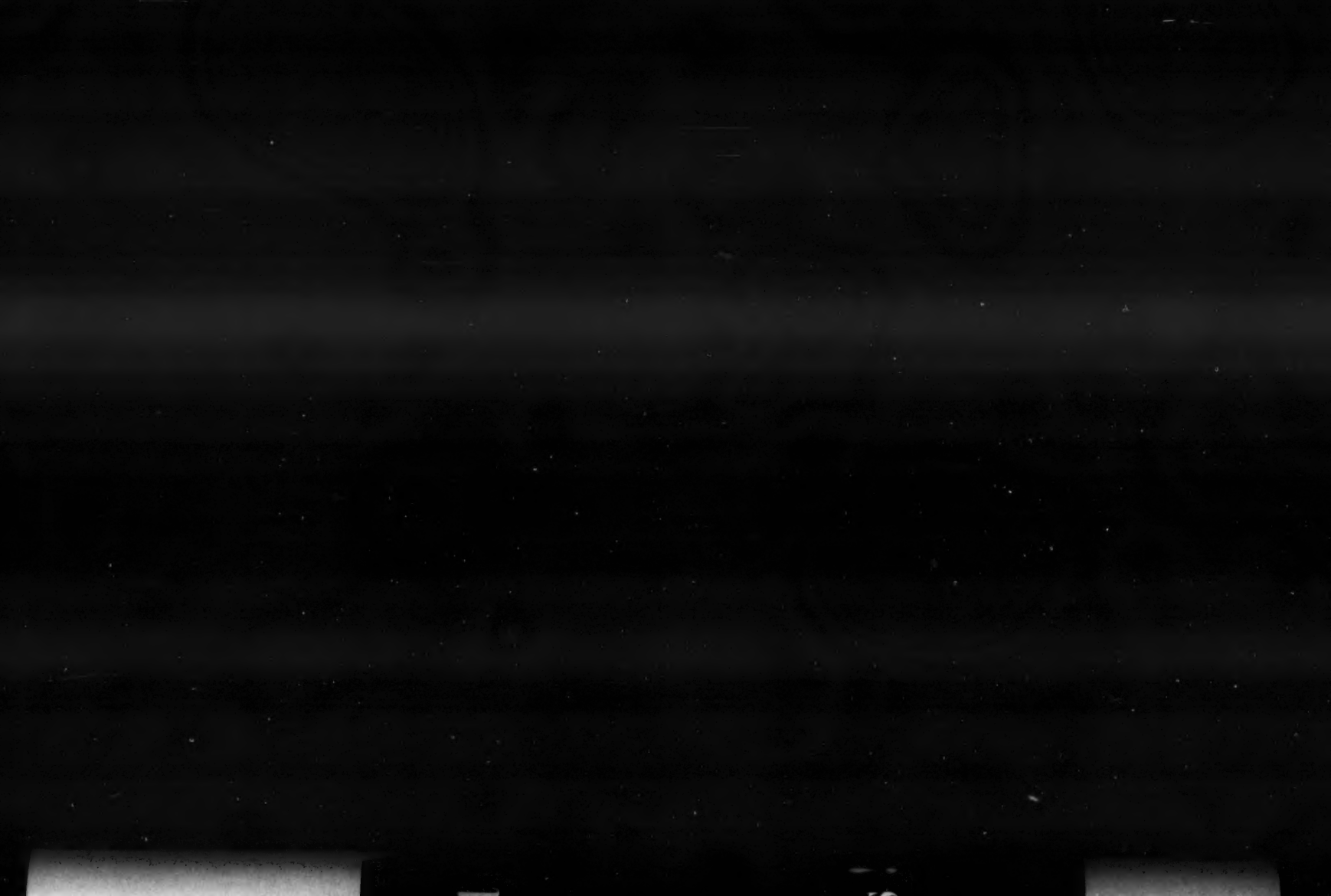

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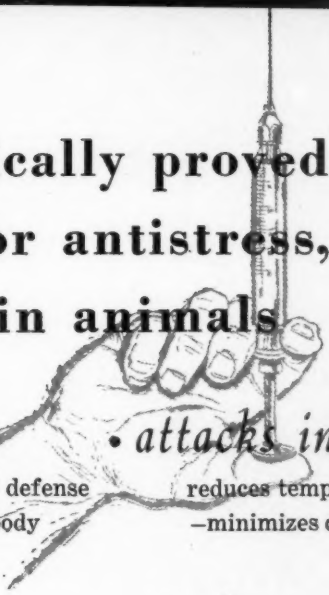

- *combats stress* — supplements natural defense mechanisms of the body
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- *checks infection*
- *speeds recovery*

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Paschkis, Karl E.: Clinical Endocrinology, Hoeber-Harper, New York, p. 301.

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Selye, Hans: Stress, Acta, Inc. Montreal, Canada, p. 38.

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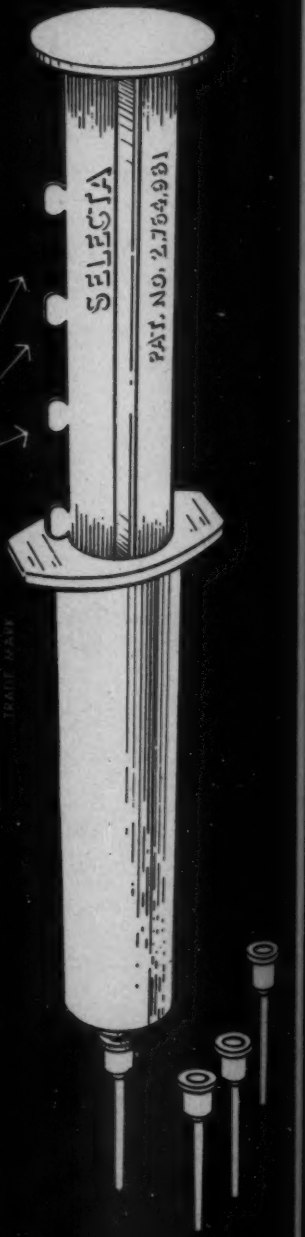

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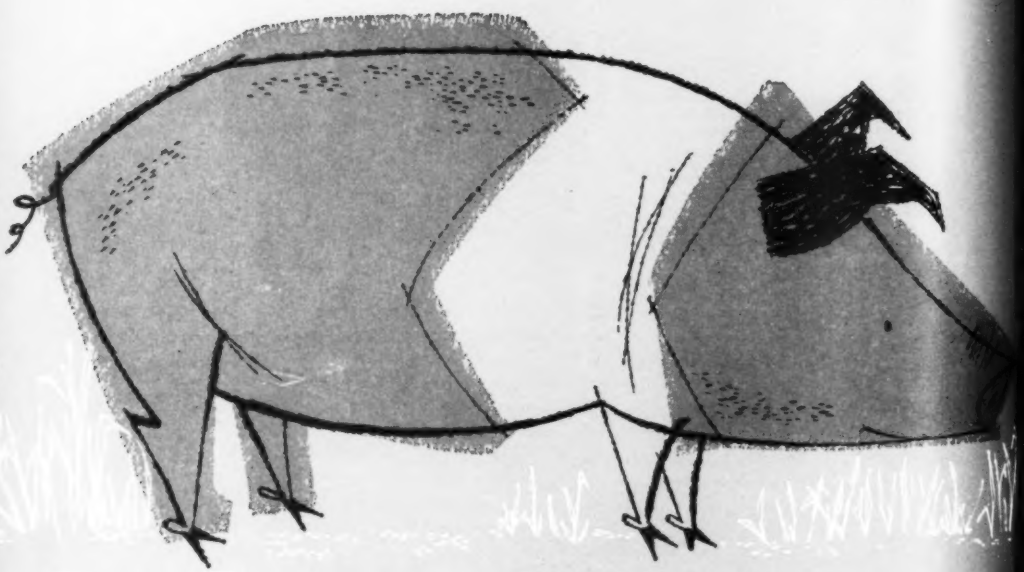

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Some Results Of Phenothiazine As A Means Of Controlling Gastrointestinal Parasites Of Calves†

G. C. SHELTON, D.V.M., M.S., D. E. RODABAUGH, D.V.M., and CECIL ELDER, D.V.M., M.S., Columbia, Missouri

FOR many years internal parasites, particularly common stomach worms, have been of vital concern to sheep raisers in Missouri and surrounding states. However, with few exceptions, cattlemen in this area have not been greatly concerned with gastrointestinal parasites in their animals. More recently evidence has begun to appear which would indicate that internal parasites are becoming more important in cattle, especially in the concentrated dairy region of south Missouri.

Review of the Literature

Studies have been made in several sections of the nation to determine the effect of phenothiazine on gastrointestinal parasites of cattle when it was administered in small doses: Mayhew[1, 2, 3, 4] in Louisiana, Brock, Pearson, and Kliewer[5] in Oklahoma, Cauthen[6] in Texas, Herlich and Porter[7] in Alabama, and Dennis, Swanson and Stone[8] in Florida. The findings of these workers have recently been reviewed by Dennis[8] *et al.*

Materials and Methods

Larvae for all experimental infections were cultured according to the method of Cauthen[6]. Feces for these cultures were collected from several different herds in the central Missouri area.

Calves were artificially infected by the oral administration of infective larvae.

Fecal samples were collected each week and egg-per-gram counts were made using a modified Lane centrifugation method.

In both experiments the calves received a grain ration to which the phenothiazine* was added so that each calf would consume from 1.5 to 2 gm. daily. The control calves received the same ration without phenothiazine.

All calves used for experimental infections were obtained from local dairies and were mostly Holsteins. (Two Brown Swiss and three Jerseys were also used in the second experiment.)

Experiment and Results — In 1954

Four calves were raised in small pens on elevated slatted floors. The floors of these pens were washed daily and all fecal material was cleared away. Two weeks prior to the beginning of the experimental infections low level phenothiazine was introduced into the ration of two of these calves. These calves were relatively free of parasites at ten weeks of age at which time each calf received a dose of approximately 15,000 infective larvae. A similar dose of larvae was administered daily for the next ten consecutive days.

†From the School of Veterinary Medicine, University of Missouri, Columbia, Journal Series Number 1647. Approved by Director.

*The phenothiazine was purchased from Jensen-Salsbery Laboratory as Boviphene-D.

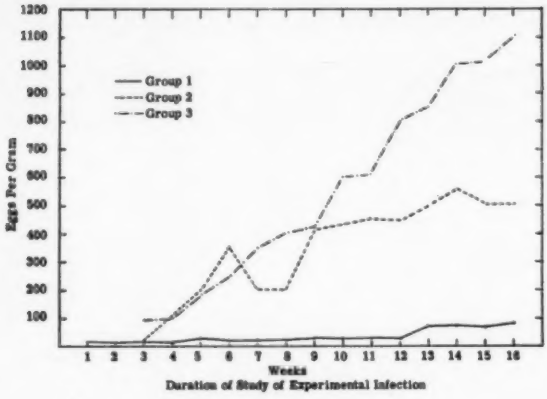

Fig. 1. The mean average worm egg count for each group of dairy calves.

All of the calves began eliminating eggs of the superfamily Trichostrongyloidea between 18 and 20 days following the first infective dose of larvae. After the first week of the patent period the egg-per-gram counts usually varied from 200 to 300 eggs. There was no detectable difference in the egg output between the phenothiazine fed calves and the controls.

The results of fecal culture studies may be noted in table 1. By the tenth day of the patent period the number of infective larvae cultured from the phenothiazine-fed calves was considerably less than 1% and in some cases no larvae were found.

There was no significant difference in the weight gains made by these calves.

Approximately nine weeks after the experimental infections were begun the four calves were sacrificed and estimates were made of the total number of parasites present (table 2). The infections were all relatively mild. One point of possible significance might be the fact that the numbers of adult *Haemonchus contortus* found in the phenothiazine-fed calves were considerably less than in the control calves.

Experiment and Results — In 1955

Twelve young dairy calves were obtained during January and February for the initial part of the experiment. Six of these were raised in stalls with concrete floors. The bedding was changed at regular intervals and every possible effort made to keep the calves as nearly parasite-free as possible. The remaining six calves were raised in portable pens according to the method of Davis and Bowman[10]. In April four additional calves were obtained and kept in portable pens until July 1.

On May 30 the original 12 calves were divided with respect to age, weight, and breed, as nearly as possible into three equal groups. Each group was then placed on approximately one acre of a newly established pasture of orchard grass and lespedeza.

Group I served as a control group and received no phenothiazine and no parasite infections.

Group 2 received phenothiazine in the feed at the rate of 1.5 gm. per calf per day for the first 60 days and 2 gm. daily for the remainder of the experiment. Each calf was artificially

TABLE 1. Comparison of the Results from Larval Cultures Between Calves Fed Low Levels of Phenothiazine and Control Calves

	Low Level Phenothiazine				Controls			
	Calf — 797		Calf — 785		Calf — 781		Calf — 786	
Date	EPG	PCV	EPG	PCV	EPG	PCV	EPG	PCV
9-4-54	61	1	33	5	37	20	17	None
9-8-54	132	.09	220	1.1	156	26	112	12
9-15-54	792	.001	124	.07	152	17	90	35
9-19-54	256	None	120	.01	114	26	142	27
9-24-54	254	None	126	None	176	18	238	12

EPG = Egg per gram counts. PCV = Per cent viability (calculated on the basis of larvae that reached the third or infective stage.)

TABLE 2. Estimated Number of Parasites Found at the Time of Autopsy Approximately Nine Weeks After Artificial Infections Were Induced

	Stomach	Small Intestine		Large Intestine
	Hemonchus	Cooperia	Strongyloides	Oesophagostomum
797*	13	1120	800	0
785*	4	1960	200	0
781	121	1086	288	3
786	138	1252	250	7

*Received approximately 2 gm. phenothiazine daily.

TABLE 3. Weight Gains Over the Period of 140 Days of Experiment for the Original Three Groups of Calves

	Calf	Weight Gain lb.
Group 1	604	227
	606	194
	610	194
	612	187
	Mean Average Gain—Group 1—200½ lb.	
Group 2	601	258
	603	245
	608	170
	611	155
	Mean Average Gain—Group 2—207 lb.	
Group 3	602	249
	605	186
	607	162
	609	155
	Mean Average Gain—Group 3—188 lb.	

infected with approximately 120,000 parasitic nematode larvae in divided doses over a period of 35 days.

Group 3 received no phenothiazine but did receive the same artificial infections as group 2.

On July 1 the four remaining calves, ten weeks of age and as far as could be determined parasite-free, were added to the original groups. Calves 613 and 614 were placed with group 2 and 615 and 616 were placed with group 3. Unfortunately, all four of these calves developed acute coccidiosis within 16 or 18 days after being introduced into the pens with the older calves. Calf 615 died and the remaining calves were considerably stunted.

Results

The variations in weight gains for the three groups are shown in table 3. It may be noted that the phenothiazine-fed calves (group 2) gained an average of 19 lb. per calf more than those of group 3 which were parasitized but did not receive phenothiazine. Likewise, the phenothiazine-fed calves gained 7 lb. per calf more than the control calves which had no phenothiazine and an almost imperceptible level of internal parasitism. Statistical evaluations made upon the weight gain data failed to reveal any significant difference which could not have been easily explained by chance alone. It is obvious that conclusions can not be drawn regarding weight gains from such limited numbers of animals.

The weekly egg-per-gram counts for the strongyle-trichostrongyle group of internal parasites are illustrated by figure 1. It may be noted that the egg count for group 3 was considerably higher than group 2 toward the end of the experiment. However, at no time did the egg counts for the phenothiazine-fed calves fall below moderate levels. In the opinion of the writers this difference in egg counts toward the end of the study reflected the difference in amount of gross infection between the two groups. There was no evidence noted during these studies to indicate that phenothiazine materially reduced the egg laying capacities of the gravid female parasites.

These observations do not agree with those of some other workers[2, 5]. However, it appears that the effect of phenothiazine on the egg laying ability of the female varies with different genera of gastrointestinal nematode. Mayhew[1,2] stated that 1.5 gm. of phenothiazine fed daily caused calves to become negative for nodular worm eggs within a period of from six to 14 days. When phenothiazine was fed at the same rate to calves with hookworm infections, egg production was not affected.

It should be noted that calves 613, 614, 615 and 616 were not experimentally infected, but

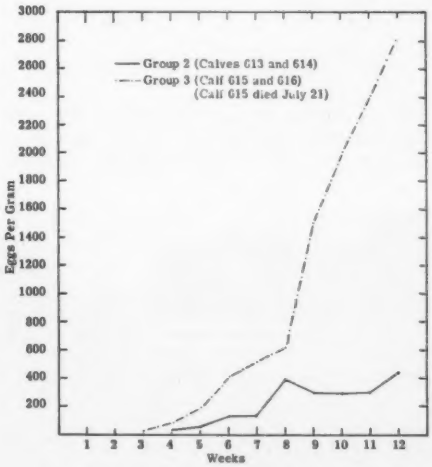

Fig. 2. Mean average egg count for additional calves placed with Group 2 and 3 on July 1.

TABLE 4. Estimated Number of Parasites Found in Calves at the Time of Autopsy Approximately Ten Weeks after they were Placed in Infected Pastures

Group	Calf	Stomach		Small Intestine		Large Intestine		Total Unidentified Larvae
		Hemonchus	Ostertagia	Cooperia	Moniezia	Oesophagostomum	Trichuris	
2	613	180	615	15,625	0	30	65	645
2	614	168	316	24,000	5	0	70	700
3	616	3,040	11,510	60,150	0	660	80	13,580

were placed with group 2 and group 3 in order to compare the relative number of infective parasitic larvae present in the two pastures. The egg-per-gram counts for these calves may be noted in figure 2. After ten weeks on pasture calves 613, 614 and 616 were sacrificed and estimates were made of the parasite populations in the gastrointestinal tract (table 4).

The two calves 613 and 614 from the low level phenothiazine pasture (group 2) had much lighter infections of the genera Haemonchus, Ostertagia and Oesophagostomum than did calf 616 of group 3. Calf 616 also had more Cooperia than did the phenothiazine-fed calves, although the ratio between the treated and untreated calves is much lower in this instance. As would be expected, there was little difference in numbers of whipworms found in the three calves.

Palatability of Phenothiazine in Feed

At no time during these studies did the calves fail to consume the feed containing phenothiazine. No undesirable side effects from eating the phenothiazine were noted by visual observations. Blood studies were not made.

Rainfall

During the months of May, June, July and August of 1955, the official rainfall was about average for central Missouri with the exception of July. Only 2.77 in. of rain fell during July and pastures were badly burned.

Summary

Under the conditions of these experiments it appeared evident that small amounts of phenothiazine administered daily to young dairy calves greatly reduced the number of gastrointestinal parasite larvae which developed to the infective stage under laboratory culture conditions.

Phenothiazine did not appear to alter the total parasite egg output, nor did it change the prepatent period of the parasites.

Young dairy calves with moderate infections of gastrointestinal parasites and fed small daily doses of phenothiazine made slightly better gains than a similarly parasitized group of calves not fed phenothiazine.

According to observations made on a small number of animals, using both data from autopsied calves and egg-per-gram counts as a criterion, it appeared that the amount of gastrointestinal parasitism acquired by susceptible young dairy calves on pasture was considerably less when all older animals on that pasture were receiving phenothiazine at low levels in the feed.

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Fig. 3, group 2. Phenothiazine-fed calves, on the left. Group 1, control calves, may be seen in pen on the right.

Fig. 4, group 3. These calves were artificially parasitized but did not receive phenothiazine. Pictures made early in July.

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Contagious Ecthyma Transmissible

Probable human cases of contagious ecthyma resulting from contact with infected sheep are reported from the southeastern section of the country.

The disease and its probable source were recognized in Australia as early as 1936. Some years later virus was recovered from three naturally occurring infections in man. Experimental infections in man were reported by Pask *et al.*, (*Med. Jour. Aust.*, Nov. 10, 1951).

Fluoridation of Water Supply

Nearly 45% of communities of 500,000 population or over in the United States are fluoridating their water supplies. Number of person drinking fluoridated water has increased by about 4,000,000 a year during the last few years so that approximately a total 26,000,000 persons in about 1,300 communities, or roughly one of every four persons using a central water supply are drinking water with an adjusted fluoride content.—*Public Health Reports.*

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Encephalomyelitis Outbreaks in Massachusetts

Preliminary information relating to outbreaks of human encephalomyelitis are reported in *Morbidity and Mortality Weekly Reports.* The Massachusetts Department of Public Health has reported 12 human cases of eastern equine encephalomyelitis with seven deaths. Virus isolations have been made from four fatal cases. A total of 38 cases in horses have been reported officially, from which six isolations were made. Two virus isolations have been made from pheasants.

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Trend in Use of Antibiotics

A major trend toward use of combined antibiotics is gaining momentum in medical circles, according to *Medical News* (Oct. 22, 1956).

Researchers and physicians have believed that antibiotics should be selected on the basis of their proved efficacy against an identified pathogen. Calculated combination of these agents appear to have advantages of synergistic action and minimal development of resistant microorganisms.

Immunization Of Horses Against Leptospirosis By Vaccination

ALBERT L. BROWN, Ph.D., ALAN A. CREAMER, V.M.D., SAMUEL F. SCHEIDY, V.M.D., West Point, Pennsylvania

A short time after *Leptospira pomona* was discovered to be a new disease agent in cattle in the United States, serological evidence was obtained that this organism might also infect horses and that it might be the cause of periodic ophthalmia.[2]

Little, Beck and McCahon[2,3] reported finding antibodies in three horses which were associated with an outbreak of leptospirosis in cattle. The disease in the horse was characterized by jaundice, fever, weakness, and an eye condition followed by blindness.

The first study of leptospirosis in horses in which *L. pomona* was isolated was made by Roberts, York and Robinson.[4] The disease in these animals was characterized by a temperature of 103.5-105 F. for 48 hours along with depression or dullness and anorexia. Two of the six horses developed jaundice. Periodic ophthalmia appeared later.

In a study by Bryans[5] it was demonstrated that the disease in experimentally infected horses was characterized by a transient hemolytic anemia and grossly visible icterus in the more severely affected animals.

It is interesting that Leptospira have not as yet been recovered from the kidneys or urine of infected animals. From what is known of the disease in other animals, it would be reasonable to expect that kidney damage might be a permanent after effect.

At the present time, the only effective method of controlling leptospirosis is by vaccination and since antibodies against *L. pomona* have been found to predominate in the serological surveys conducted in the United States,[1,6] *Leptospira pomona* bacterin should provide an effective means of control.

In order to determine if the immune response to vaccination would be the same as in other animals, it was decided to inoculate a group of horses and follow their serological picture. The results of this experiment are reported in this study.

Methods

Bacterin. The preparation used in these studies was from a regular lot of *L. pomona* bacterin.* The development and preparation of this product have been described in a previous publication.[7]

Method of Determining Serum Antibody Titer

The test was performed by making serial fivefold dilutions of serum in 0.4 ml. of saline starting with a 1:5 dilution. An equal amount of an actively growing Leptospira culture was then added to each tube making the final dilution of serum in the first tube 1:10. Dilutions from 1:10 to 1:6,250 were prepared. Tubes were shaken and then incubated in a 30 C. water bath for three hours. Tests were read by placing a 0.04 ml. drop on a slide, placing a cover slip over it and examining it under a darkfield microscope. Tests were read as ++ for complete lysis or agglutination, + where most of the Leptospira were agglutinated or lysed, ± where only a few were agglutinated and — when there was no agglutination. To simplify the table, + indicates ++ as well as + agglutination, and — includes those tests originally recorded as being ±. Positive and negative controls were included with each test. The antigen used in this test was an actively growing culture of *L. pomona* strain T262 grown in modified Stuart's medium. Serum samples were inactivated at 56 C. for 30 minutes.

Immunization of Horses

In order to select horses without antibodies, 21 normal horses were bled and their sera were tested by the agglutination-lysis test. Of these, six were found with antibody titers ranging from 1:50 up to 1:1,250. These titers were taken as an indication of a previous exposure to *L. pomona* and animals were not considered suitable for our test. The 15 remaining horses were divided into two groups in order to determine if the size of the dose of bacterin might

*Antilepto *Leptospira pomona* bacterin prepared by The Biological Laboratories of Merck Sharp & Dohme, Division of Merck & Co., Inc., West Point, Pa.

have an effect on the immune response. The first group consisted of seven animals which were injected subcutaneously in the neck region with 5 ml. and the second group of eight animals received 10 ml. of the bacterin. Following vaccination, all vaccinated horses were bled at the end of one week and then at monthly intervals for a period of six months.

Results

Results of testing for agglutination-lysis antibodies are presented in table 1. It is apparent from the data that horses developed an immune response within one week. Antibody level then remained fairly constant for two months and then gradually declined until at the end of six months it had disappeared in many of the vaccinees. The pattern of this immune response is similar to that found in cattle,[8] which also develop antibodies within one week and show about the same titers month by month for six months.

The second point of interest is that there seems to be a definite superiority in the immune response developed by the horses receiving the larger inoculum. The fact that a 10 ml. dose should give a better response than a 5 ml. dose is interesting since the amount of antigen usually has to be more than doubled to give a better immune response.

A swelling which lasted for about seven days was noted at the site of inoculation in some of the horses. Since the same lot of vaccine did not produce a similar reaction in either cattle or guinea pigs, it was concluded that this reaction was peculiar to horses. The swellings were not greater or longer lasting with the 10 ml. dose than with the 5 ml. dose. A somewhat similar observation has been reported by Bramel and Scheidy.[9]

Discussion

This experiment indicated that the serological response in horses was similar to that found in cattle; that is, antibodies were demonstrable one week following vaccination. Antibodies were demonstrable in some animals six months afterwards. It would be reasonable, therefore, to expect horses to show approximately the same degree of protection as has been demonstrated in cattle by challenge experiments.

The most surprising observation made in this experiment was that 10 ml. of vaccine produced both a higher initial antibody titer and a longer lasting titer than did a 5 ml. dose. If the correlation between antibody titers and protection in cattle can be carried over to horses, it appears that animals receiving the 10 ml. dose might be immune for one year or longer. From a practical standpoint, it therefore, is probably preferable to use the larger dose.

Because of the superficial swelling observed at the site of inoculation, it would appear desirable to allow a few days for the swelling to decrease in any case where the appearance of the animal is important.

Conclusions

A group of seven horses and another of eight were inoculated with 5 ml. and 10 ml. respectively of Leptospira bacterin and their serological response followed for a period of six months. All horses developed antibody titers within one week which gradually declined over a period of six months. The group re-

TABLE 1. Agglutination-Lysis Antibody Titers against *Leptospira pomona* in Horses Inoculated with Leptospira Bacterin

Horse No.	Dose (ml.)	Titer Pre-Inoc.	Titer Postinoculation 1 Wk.	2 Mo.	4 Mo.	6 Mo.
46	5	—	+50	+50	—	—
47	5	—	+50	+10	—	—
268	5	—	+10	+50	—	—
272	5	+10	+50	+50	+10	+10
274	5	—	+10	—	—	—
278	5	—	+50	+10	+10	+10
825	5	—	+50	+10	—	—
45	10	—	+250	+250	+50	+10
181	10	—	+250	+250	+50	+50
262	10	—	NT	+50	+10	—
267	10	—	+50	+10	—	+10
269	10	—	+1250	+50	+10	—
277	10	—	+50	+50	+10	+10
370	10	—	+50	—	—	—
1297	10	—	NT	+250	+50	+10

— = No agglutination-lysis observed at 1:10 dilution of serum.
+10 = Agglutination-lysis observed at 1:10 dilution of serum.
NT = No Test.

ceiving 10 ml. developed a considerably higher initial as well as a longer lasting titer than did the group receiving 5 ml. The results of this experiment are compared with similar results obtained in cattle in challenge experiments. It is concluded from the fact that the immunological response is so similar between the two species that satisfactory immunization is induced by vaccination.

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Anthelmintic Properties of New Antibiotic

The first antibiotic known to have a broad-spectrum effect against internal parasites was disclosed at the Fourth Annual Antibiotics Symposium in Washington, D. C., October 19, 1956.

The antibiotic—hygromycin—was reported by Max C. McCowen, head of parasitology research at Eli Lilly and Company, to be highly effective against a number of parasites in laboratory tests.

Hygromycin's anthelmintic, or worm-killing, properties in swine were reported by Dr. A. C. Todd, professor of veterinary science at the University of Wisconsin, in an address delivered before the Agricultural Research Institute in Washington, D. C. Doctor Todd said that hygromycin destroyed not only ascarids, but also other roundworms such as strongyles (nodular worms), whip worms, and possibly others.

In reporting on the earlier laboratory tests that established anthelmintic properties of the new antibiotic, McCowen said that experiments indicated hygromycin controlled *Endamoeba histolytica*, the organism causing amoebic dysentery, and *Leptospira pomona*, the causative organism of leptospirosis.

In mice, it destroyed *Borrelia novyi*, a spirochete, whether given orally or injected. The antibiotic also controlled oxyurids in mice when given either orally or parenterally. In rats, oral administration of hygromycin destroyed the organism causing amoebic dysentery.

The first work on cultivation, growth, and isolation of hygromycin was carried out in the Lilly Research Laboratories by Dr. R. L. Mann, of the Biochemical Research Department, and Dr. J. M. McGuire, head of the Microbiological Research Department, and their associates. Extensive experiments are being continued to develop fully a new concept—that of controlling internal parasites of swine by feeding low levels of a worm-killing antibiotic.

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Veterinarians in Nutrition

The American Association of Veterinary Nutritionists was organized at San Antonio, Texas, on October 16, 1956. A group of 37 veterinarians attending the American Veterinary Medical Association adopted a constitution and elected officers. Dr. Morris Erdheim, Dawe's Laboratories, Chicago, Illinois, is the first president, Dr. R. E. Lubbehusen, Ralston-Purina Mills, St. Louis, Missouri, is president-elect, and Dr. R. C. Klussendorf, Commercial Solvents Corporation, Terre Haute, Indiana, is secretary-treasurer.

Membership in A.A.V.N. is open to every veterinarian who is a member of the A.V.M.A. Already, more than 120 have expressed interest and signified intention of affiliating with the group.

Contact has already been established with the Nutrition Council of the American Feed Manufacturers Association, and the two groups plan to work cooperatively. The first project will be the preparation of a handbook listing the medicating agents which, under approval of the Food and Drug Administration, may be added to feeds, and the levels of medication permitted.

Incidence Of Hog Cholera In Iowa During The Past Year And Studies Made On Current Field Problems†

L. H. SCHWARTE,* D.V.M., Ph.D., Ames, Iowa

THE most disturbing and costly experience faced by the producers of immunization products and veterinarians, as well as the swine producers, are the numerous postvaccination problems which occur each year. Investigations and studies conducted in this field of work have been of considerable benefit to all parties involved and have contributed a great deal to information on basic virus research. This phase of work has been encouraged and supported by the Associated Veterinary Laboratories, Inc., and distributors of their products.

The incidence of hog cholera in Iowa apparently continues to decrease in most areas of the state as indicated by the annual reports of the Iowa Veterinary Medical Diagnostic Laboratory for the past three years. The number of cases of hog cholera is reported as follows:

1953	330 cases
1954	200 cases
1955	132 cases

It may be of interest to review Doctor Bennett's analysis of the 1955 report involving the cases of hog cholera which were presented to the Iowa Veterinary Medical Diagnostic Laboratory from July 1, 1955 to July 1, 1956:

1. Cases from unvaccinated herds	50
2. Cases from serum and virus vaccinated herds	20
3. Cases from herds vaccinated with serum and modified virus	26
4. Cases from herds vaccinated with modified virus only	27
5. Cases from herds vaccinated with inactivated virus	3
6. Histories of cases unknown	6

The field problems which are selected for study here at our laboratory do not represent the average hog cholera problems for which veterinarians are consulted. Cases involving infected animals which manifest symptoms and pathology associated with the disease are easily handled and disposed of by the practitioner. Infected herds in which swine show little or no evidence of hog cholera create problems which veterinarians present to the laboratories for diagnosis or confirmation of their tentative diagnoses. Consequently, most of our problems are of a specialized nature. This type of research serves the needs of the practitioner as well as the livestock producer and is an aid in the effective handling of field problems.

Since the incidence of hog cholera in this area has decreased, there has been a tendency on the part of the livestock producers to discontinue their vaccination programs. Some veterinarians have estimated that the reduction in vaccination of swine in their respective territories this past year ranged from 35 to 45% or more. We have been primarily interested in swine disease problems following vaccination or in vaccinated herds because of their value in effectively handling these immunity problems. The vast majority of problem cases selected for study have been from vaccinated herds. On the other hand a few cases in unvaccinated herds have been studied to secure information on the current virus strains existing in the field. The results of these studies indicated that in general, the viruses isolated from unvaccinated herds closely resemble the viruses isolated from vaccinated herds.

The postvaccination investigations in this report include those requested by veterinarians, confirmation of diagnoses made by the Iowa Veterinary Medical Diagnostic Laboratory, and problems involving production organizations. The laboratory technic customarily employed for the isolation of the viruses from field cases by animal inoculation were used after screening for pathogenic agents other than hog cholera virus by culture media and inoculation of laboratory animals.

A summary of this research will be presented rather than a technical report on the individual cases covering the period from September 1, 1955 to September 1, 1956.

1. Total number of field cases studied	51
2. Number of field problems from which no active hog cholera virus was isolated	21

†This work was supported by a grant from the Associated Veterinary Laboratories, Inc.

*From the Veterinary Medical Research Institute, Iowa State College.

In this article Doctor Schwarte points out an unprecedented paradox relating to the incidence of hog cholera in Iowa during the past year. In spite of limited prophylactic vaccination there is reported a lowered incidence of disease.

This can mean only that a large number and a greater percentage of hogs on farms than formerly are susceptible to cholera. Though hazards have been reduced by garbage cooking, and limited use of simultaneous virus, reservoirs of infection do exist in every swine producing state of the nation.

Swine growers must be made to realize that all infectious sources are not known, that unvaccinated hogs are susceptible, that cholera outbreaks are cyclic in nature, and that unnecessary risks ought not to be taken.

Long experience has demonstrated that a biological barrier against hog cholera is the most practical assurance against disease losses.—Editor.

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3. Number of field problems from which active hog cholera virus was isolated 30
4. Problems investigated in herds vaccinated with hog cholera antiserum and virus 4
5. Problems studied in herds vaccinated with serum and modified virus 8
6. Problems studied in herds vaccinated with modified virus only 12
7. Problems investigated in herds vaccinated with inactivated virus products 6

The histories of these cases indicate that unfavorable reactions were recorded from four to 275 days following vaccination.

The total number of problems studied was nearly twice that of last year in spite of the general decrease in the incidence of hog cholera in this area during this past year. The number of cases from which no active hog cholera virus was isolated was three-fold compared to same period last year.

Infections of swine with virus strains of low pathogenicity producing few if any characteristic clinical symptoms and no well defined pathologic changes usually associated with hog cholera, made it necessary for veterinarians and others involved to secure the assistance of a laboratory staff for diagnoses. The increase in the incidence of other swine diseases which can be confused with hog cholera was another factor involved in the increased demand for laboratory service.

Strains of Hog Cholera Virus

A limited number of virus strains were isolated which exhibited a high degree of pathogenicity, but because of their peculiar characteristics and unusual reaction in infected swine, were responsible for considerable confusion on the part of the veterinarians in making a definite diagnosis. Several viruses exhibited characteristics similar to those associated with the so-called "variants". By far, the majority of the virus strains secured from these post-vaccination infections has been of a low order of pathogenicity.

Highly Pathogenic Strains

The virus strains of this type proved to have a high degree of pathogenicity both in the field and under experimental conditions. These virus infections produced severe reactions running a course of short duration resulting in a high mortality. The lesions usually associated with hog cholera were either vague or absent. Positive diagnoses from postmortem examinations were impossible. Some of these virus strains were fairly stable but others lost much of their pathogenicity during serial passages through experimental swine.

Variants

The isolation of a virus strain now and then possessing characteristics associated with variant strains of hog cholera is a constant reminder that these variants are still with us. A couple of such strains were isolated. Several strains which had been classified as variants were submitted to our laboratory, but proved to be only strains of comparatively high pathogenicity. Our past experience with most variants indicates that they are usually rather unstable and these strains could possibly have lost their variant characteristics. However, none of these virus strains were able to break down a well established immunity in vaccinated swine.

Low Pathogenic Strains

During the past year, more problems involving virus strains of low pathogenicity have been called to our attention than ever before. They have occurred in vaccinated as well as unvaccinated swine herds. Laboratory studies indicate a remarkable degree of stability in these viruses. Animals infected with viruses of this type may or may not show any appreciable reaction. Losses of an animal or two in a large drove may occur. Many escape the loss of any animals. Recovery may be partial or apparently complete but these pigs do not make as efficient use of their food as normal pigs. Some herds are economically unprofitable to raise to market size. Animals which recover from this type of virus infection develop a well established immunity. Some veterinarians report beneficial results from large doses of hog cholera antiserum; others do not.

This type of infection does not respond to antibiotics as a rule, but they may prevent the development of secondary infections.

Infections Confused with Hog Cholera

The current number of cases believed to be hog cholera from which no active hog cholera virus was isolated has been by far greater than any comparable period in recent years. These problems involve various types of infection which are most difficult to diagnose. Enterotoxemia in various stages which produce similar symptoms and lesions were responsible for some herd losses attributed to hog cholera.

Septicemias due to bacterial infections have frequently been diagnosed as hog cholera. Extremely high temperatures of 109F. or higher have been recorded. Several such infections were apparent in the herds several days after the purchase of swine from sales barns. Symptoms resembled an acute form of hog cholera. The hemorrhages and degenerative changes associated with high temperature reactions which are found in these cases are often mistaken for lesions of hog cholera. These swine conditions confused some of the veterinarians and diagnosticians as well.

The extensive involvement of the lungs with multiple abscess formation and various stages of pneumonia together with abscesses in the lymph nodes were found in animals brought to our laboratory. The isolation of pathogenic bacteria and failure to isolate hog cholera virus were the bases for a definite diagnosis. Some veterinarians reported favorable results following the use of mixed bacterins, others reported little if any improvement following this form of treatment. Many of the strains of bacteria isolated from these types of infection appear highly resistant to antibiotics. Little benefit is secured by this type of treatment.

Several cases of swine erysipelas have been sent to the laboratory having been tentatively diagnosed as hog cholera. Considerable difficulty was experienced in isolating the organism but two swine herds developing the acute form of the disease responded to serum treatment.

Immunity Tests as Diagnostic Measures

An accurate diagnosis is practically impossible when infected animals show no characteristic symptoms or lesions associated with hog cholera. Most of the virus strains of low pathogenicity studied this year possessed a fairly good degree of antigenicity and the diagnoses could be confirmed in most instances by immunity tests. Experimental pigs which have been injected with a virus strain of low pathogenicity, can be challenged with 5 cc. commercial hog cholera virus several weeks after the initial injection. If they prove to be immune, it is good evidence that the infection was due to a virus strain having low pathogenicity. This method of diagnosis is time consuming and costly. The diagnosis involving virus strains of high pathogenicity can be confirmed by animal inoculation in five to seven days. When immunity tests are necessary, several weeks or more may be required.

Testing Vaccination Products

Several serial numbers of vaccine and serum were tested for purity and potency during the past year. The products were found to be adequate for vaccination if properly used and found to be free from foreign pathogenic agents.

Summary

The incidence of hog cholera in Iowa apparently continues to decrease in most areas of the state as indicated by the annual reports from the diagnostic laboratory and surveys made in the field. There also has been a reduction in the vaccination of swine herds estimated from 35 to 45% or more.

A summary of research on field problems covering the period from September 1, 1955 to September 1, 1956 carried on at the Institute is briefly discussed. The histories of the unfavorable reactions were recorded from four to 275 days following vaccination.

The total number of problems presented and studied were nearly two-fold compared with that of last year in spite of the general decrease in the incidence of hog cholera in this area during the past years.

The various strains of hog cholera virus isolated from the field cases are described. Strains of high pathogenicity, variants and virus strains of low pathogenicity are described.

Various infections occurring in the field which have been confused with hog cholera are described. The resistance of certain bacterial infections to antibiotic therapy is mentioned.

The use of immunity tests as diagnostic measures is reported. The time involved and expense of these procedures are discussed.

The vaccination products tested at the Institute for potency and purity were found to be adequate for vaccination purposes and were free from foreign pathogenic agents.

Moniliasis As A Systemic Infection In Cattle: Field Case Reports

R. T. McCARTY,* D.V.M., Dallas, Texas

THE relatively new, but specific, entity of moniliasis *(Candida albicans)* has been recognized in man for several years. Likewise, instances of *C. albicans* infections and complicating involvements in veterinary medicine have come into focus recently. Many references to this entity by both clinicians and researchers indicate that increased incidence is thought to be in some way correlated with the general use of broad-spectrum antibiotics.

Hagan[1] describes the organism and its cultural features, but states that the infection is usually limited to oral thrush-like lesions of birds, indicating that they are quite common and often serious. He also suggests that types found in birds can not be distinguished from those isolated from man. Hagan also states that "some authors refer to Monilia infections of the oral mucosa in calves and colts." Presumably these are of little consequence in large animals since no additional specific information is available. Quin[2] believes that an increase in incidence of mycotic enteritis in swine during the past three years may be due to continuous low-level feeding of antibiotics. An editorial in the *Journal of the American Veterinary Medical Association*[3] warns that antibiotics may cause indigestion, especially in ruminants, while "dysentery and mycosis are frequently reported" due to the restraint of beneficial bacteria antagonistic to fungi. Further, another editorial[4] warns that animal mycotic diseases occur often as secondary invaders after bacterial infection and that antibiotics are largely responsible for the increase in fungus diseases.

Case Reports

During the weeks of Nov. 28, 1955, Mar. 4, 1956, and Mar. 26, 1956, several cattle feed lots in the El Centro, California area were visited where there was a common complaint of an excessively high percentage of animals suffering "chronic pneumonia" referred to as "lungers." (This last reference is not to be confused with "roarer" or laryngeal hemiplegia). The anomaly appeared in animals brought into treatment pens exhibiting symptoms of pneumonia, and after treatment continued to exhibit symptoms without febrile reaction, or relapse into a similar "pneumonic" condition (without fever) which does not respond to antibiotic medication. Symptoms were reported to be intensified after treatment. Numbers of animals in any one sick pen on these large feed lots vary with the season, but may be expected to range from about 3 to 20% of animals treated for a "pneumonic" condition. Many of these animals did not show the initial febrile reaction common to pneumonia, but began a steady decline in general condition after arrival in the feed lot, and being subjected to preventive treatment with one of the broad-spectrum antibiotics. Invariably the history on these cases revealed that the animals had either been treated with one or more of the broad-spectrum antibiotics or one or more had been added to the feed at various levels or both.

Pattern of infection is rather uniform, starting with a rather mild febrile reaction, and severe respiratory symptoms. While body temperature rarely runs more than 1 to 2 degrees above normal, symptoms are those of a bacterial pneumonia. Symptoms are confined to the respiratory tract. Affected animals frequently exhibit no marked depression. Dyspnea, rales, and an increase salivation are common. In the later stages, saliva turns to a thick, stringy, sticky, mucoflocculent form, and a nasal discharge appears which is mucopurulent in nature, brownish in color and giving the appearance of being streaked with reduced hemoglobin and blood. Thereafter animals become depressed, dehydrate rapidly with an accompanying loss of weight, and assume the attitude of standing with the head slightly extended in an effort to breathe more easily. Frequently, a profuse diarrhea is noted, which adds to dehydration. The muzzle becomes encrusted with a brownish crust resembling dry mucus which peels without excoriation. This crust may cover the entire muzzle, or may be in spots over the surface. There is

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no erythematous condition or ulceration of the muzzle, nasal cavity, or mucous membranes in the mouth. There is generally an excessive lacrimation and consequently encrusted hair below the eyes; however, no corneal opacity was observed. Affected animals in the later stages are emaciated, weak, listless, and lethargic, and have a typical "tucked-up" abdomen, rough hair coat, short shallow respiration, and frequently allow their tongues to protrude slightly. As the debilitating effects progress, so does the anorexia; however, animals may exhibit periods of spontaneous rallying in which they may begin eating and licking themselves. Relapses are common with increasing severity.

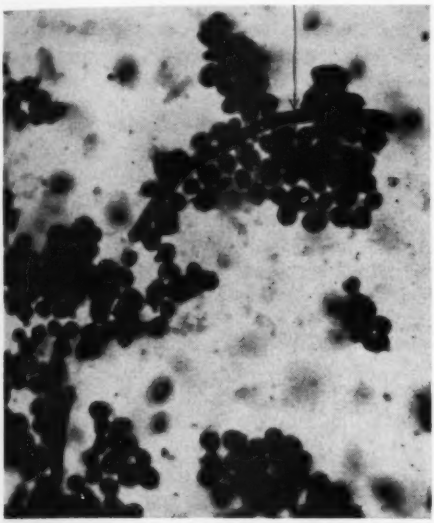

Fig. 1. Candida (Monilia) albicans. Isolated by media culture on Sabouraud's enriched media from lung lesion steer. Arrow designates pseudohyphae.

On autopsy of three animals, each exhibited emaciation throughout, pneumonic solidification of the alveolar tissue, with nodules showing through the solidified areas. On cut surface of these solidified areas, nodules which vary from pin-point size to 20 mm. in diameter are clearly evident. These resemble closely yellow tubercle having a caseous center, and a firm tissue-like gelatinous capsule, but with no great amount of scar tissue involved. (In two of the three animals there was little scar tissue surrounding the nodule, while in the third the scar tissue generally was 2 to 3 mm. in thickness). This resembles somewhat the description given by Davis[5] for mucormycosis. In each of these animals *C. albicans* was isolated from the cut surface of nodules, and yeast bud forms were seen on microscopic examination of smears from these areas. In the late stages renal lesions may be seen, usually showing a decolorization of one or both kidneys, or areas in the kidney. The decolorization extends from the cortex to the calyx, and apparently intracellular swelling occurs which renders the entire area extremely friable. No hemorrhagic spots were noted in the animals autopsied, but yeast bud forms were seen on microscopic examination of slides from the cut surface of kidneys from two of the three animals. Subsequently, *Candida albicans* was cultured from one. In terminal moniliasis the lumen from the bronchi to the terminal bronchioles is filled with a brown foam which again yields yeast bud forms. Lungs are almost completely solidified and apparently animals die of suffocation. The epithelial lining of the trachea is slightly discolored, is not apparently hemorrhagic or ulcerated, but the color resembles that of the nasal excretions. Intestines were apparently normal, except in those animals with diarrhea, where the lining was inflamed, and one animal revealed a caseous necrotic plug in the lining, culture of which yielded *C. albicans*.

Slide smears from various tissues stained with Gram's stain revealed moderate to heavy concentration of budding yeast forms, morphologically resembling *C. albicans*. Those areas which yielded the budding yeast forms were: Cut surface of the solidified portions of the lungs across a caseous nodule, kidney (discolored portion), tracheal foam, nasal exudate, salivary secretions, and intestinal plug. Yeast bud forms were not observed in slides from the jugular blood, heart blood, liver, bile, pleural surface of the lungs, spleen and feces. In November 1955, cultures from six different live animals exhibiting typical symptoms were made from swabs of the ventral and middle meatus of the nasal cavity on Sabouraud's maltose media. Four of these showed growth of *C. albicans*. Two tubes showed only gross bacterial contamination. Of cultures showing bacterial growth, Gram positive rods, Gram negative rods, and Gram negative diplobacilli were present. Again in November 1955, ten swabs were made from ten different animals exhibiting typical symptoms which were taken to a commercial laboratory for study. Swabs were cultured in thyroglycollate broth for 24 hours. Of ten slides prepared from the broth, stained with Gram's, two did not show yeast bud forms. Subsequently, subcultures from each of these eight tubes were made to tergitol — 7 agar (modified), and six of the eight

produced *C. albicans* growth. In the week of March 4, 1956, five animals were observed showing symptoms which resembled those seen previously. Of the five swabs taken from these animals, four revealed yeast forms on slides made directly from field swabs. On cultures of these five field swabs on Sabouraud's maltose media all showed some type of fungus growth. Two of these however, were pathogenic, *i.e.*, Monilia and Mucor.

Summary

Moniliasis was diagnosed by gross and laboratory findings at autopsy on three animals and by bacteriological procedures on 11 of 21 animals.

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Foreign Embargoes on Pork Products Because of Swine Diseases

American pork producers are losing a potential export market of 70,000,000 lb. of pork products through embargoes by foreign countries who fear introduction of vesicular exanthema and hog cholera from this country, stated M. A. Drisko, deputy administrator, Foreign Agriculture Service, USDA.

This fact and many others were revealed at the recent Workshop Conference held in Chicago under the sponsorship of Livestock Conservation, Inc. Representatives of all branches of the swine industry, researchers and control officials attended, which was presided over by Mr. Herman Aaberg of the American Farm Bureau Federation and vice-president of Livestock Conservation, Inc.

The general feeling of the conference on the possibility of the eradication of hog cholera was summed up by Dr. S. H. McNutt of the Veterinary Science Department, University of Wisconsin and chairman of the Swine Disease Committee of the National Swine Council when he said, "We already know far more about hog cholera than when we set out to eradicate tuberculosis. Are we going to use this knowledge and eliminate it; or are we going to miss this opportunity?"

The conference agreed that just as soon as veterinary research authorities gave the word modified and inactivated hog cholera virus vaccines can replace completely simultaneous live virus.

"Hog Cholera is present in all 48 states today," reported Dr. C. D. Van Houweling, director, Livestock Regulatory Program, USDA, and, "During the first eight months of this year 37 states reported 1,690 outbreaks of the disease affecting 35,000 hogs . . . and these figures are not considered complete."

The USDA estimates the presence of hog cholera cost the American pork producers at least $24,000,000. annually over a ten-year period, ending in 1952. Another $30,000,000. that farmers paid last year for immunizing materials and their use may be added to disease cost. Still only about one-half the hogs in the United States were vaccinated for cholera.

Dr. L. M. Hutchings warned against complacency regarding vesicular exanthema. He reminded his hearers that the disease did not appear in California for 42 months prior to its spreading across the entire country.

Ten percent of the commercially fed garbage hogs in this country are still being fed raw garbage despite enactment of garbage cooking laws in 46 states," continued Doctor Hutchings. "Lax enforcement plus unrestrained feeding of home garbage, containing raw pork trimmings, presents potential sources of infection for new outbreaks of vesicular exanthema, hog cholera, trichinosis, and other swine diseases."

Our neighbors to the north in Canada have already proved it is feasible to eradicate hog cholera. The cost last year of eradicating the two outbreaks in 1955 was less than the cost of vaccinating hogs in just one-half of one county in the Corn Belt.

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A California hog feeder was charged and fined $50. and sentenced to serve six months in jail for violating that state's law regulating the feeding of uncooked garbage to swine. Jail sentence was suspended under conditions outlined by the court.

The law under which this feeder was arrested became effective in California on January 1, 1956. All garbage feeding hog ranches must be licensed by the state after satisfactory heating equipment is installed and procedures approved.

Magnets: A Therapeutic Agent In The Treatment Of Traumatic Gastritis

L. S. NILSSON, JR., V.M.D., Branchville, New Jersey

THE importance of traumatic gastritis and its associated complications in dairy practice are documented and well understood. During recent years, rumenotomy has been resorted to in many such cases. Experience has strengthened the conviction that surgery is too frequently impractical from the standpoint of an economical procedure as well as a rational one considering available facilities for performance of proper technics[1, 2, 3].

During the past two years the writer has used a metal detector* routinely in suspected cases of "hardware" disease. Animals suffering traumatic gastritis, diagnosed on the basis of history, symptoms, and findings with the above instrument, have been treated orally with alinco® noncorrosive magnets, antibiotics parenterally (penicillin and streptomycin), and occasionally dextrose intravenously, but without surgical intervention.

Of 107 animals thus treated six died or were butchered because of this condition. In one large herd (1,500-1,800 head) over which the writer has had daily and continuous supervision for over a year, 78 cows were treated in this way. Treated animals have increased their milk production (daily production records available) and have improved in physical fitness without exception, regardless of their age, stage of lactation or gestation or their physical condition. Several of these animals have freshened since treatment without complication except for one cow (case 1).

Many of these animals were on advanced registry (AR) test and have continued on milk production records without interruption. Exceptional results have been observed in just a few days after treatment in animals; others did not respond for a week or two. Milk production has dropped to 9-15 lb. per day and has soon risen to 50-60 lb. per day (case 2). General physical condition in all animals also has improved rapidly.

Of the six unsuccessful cases, two were sent to the butcher (three weeks and three months after treatment). Necropsies were done on the other four by the writer who believes that a rumenotomy would not have relieved the condition present, except perhaps in one young bull where the greater part of a three inch wire was penetrating the diaphragm. This animal might have recovered had the portion of the wire on the thoracic side of the diaphagm not been kinked. This assumption is made on the basis of the evidence found on necropsy of the other three animals. It is not logical to expect the magnet to "back-up" imbedded metallic material but if a little thought is given to the phenomena of magnet attraction working between the metallic foreign material and the magnet and the rhythmic contractions of the reticulum, one may easily imagine how the retraction of imbedded hardware could be possible. In one of these animals the offending nail was retrieved by the magnet but the animal died a week later of a severe intestinal hemorrhage (case 4). In two others the heart was damaged with death following a week later (case 5) while the other improved for four weeks then died of traumatic infarct in the heart (case 6).

The offending material was completely removed from a few animals with a Muffly retriever[3]. In one animal, which did not respond satisfactorily, the magnet previously administered, was retrieved by the oral route with a five inch wire attached (case 7). Several small wires were likewise removed from another cow which did not respond satisfactorily, but remained alive long enough to calve a few weeks later and was then destroyed. Usually, the magnets were left in the animal.

In cows with a mild or subclinical hardware disease the farmer may not be concerned by the reduced milk production. These animals may live for a long time without treatment. Many cases of indigestion and bloat may be due to a foreign object in the reticulum. These are the cases which the writer believes are overlooked. These are also the animals which can be successfully treated by the use of magnets. The writer believes that a great many of

*D.P. #822697, Elektro-Geraetebau Bavaria, Inc. Kurt Liersch, Oberoelkofen (Obb.) Germany.
[2]The Indiana Steel Products Company, Valparaiso, Ind.

the classical cases of traumatic gastritis might also respond satisfactorily with orally administered magnets.

Case Reports

Case 1. On Dec. 15, 1955 a Guernsey cow was off feed, rumen action suppressed and milk production down to 11 lb. per day. The detector reaction was positive. A magnet was administered orally. Three days later milk production was 26 lb. per day. On April 27, 1956 this cow calved and was placed on advanced registry test. On June 8, 9, and 10, because of a positive Ross test, 500 cc. of 50% dextrose was administered intravenously. On June 11, temperature rose for the first time since freshening to 104.8 F. Pencillin and dihydrostreptomycin therapy was given for three days. The detector indicated that the magnet was still present. Milk production had dropped from 59.9 lb. on June 1 to 22.5 lb. on June 14. It rose to 50.1 lb. by the last of the month.

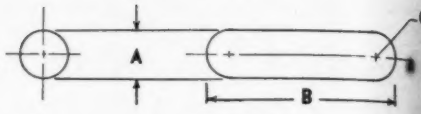
Case 2. A Guernsey cow which had freshened on April 9, 1955 had been treated daily between May 2 and 7 with dextrose solution. Regression and loss of milk production continued and on May 9 milk production was

Courtesy Dr. J. A. Muffly

Magnetic retriever properly assembled and ready for use.

15.2 lb. A positive detector reaction indicated the presence of a foreign metallic object. A magnet was administered orally that day and milk production rose to 50.9 lb. by May 30. The cow finished her lactation on July 1 producing 40 lb. per day.

Case 3. A Guernsey cow, fresh 19 days was producing 73.9 lb. per day on July 22, 1955. During the next four days this animal was treated for acetonemia but production dropped to 53 lb. and temperature held at 103 F. The metal detector reaction was positive. A magnet was passed orally and anti-



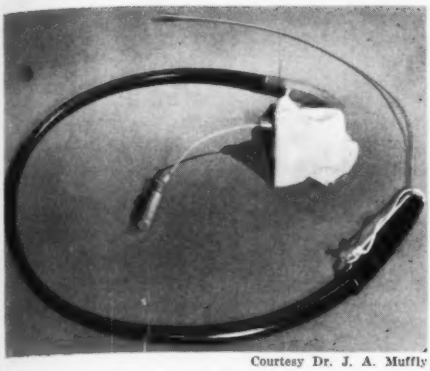
Alinco magnet. Two sizes for larger ruminants are as follows: (A) Diameter, .500 and .625 in.; (B) length, 2.250 and 2.750 in.; (C) spherical radius, .250 and .321 in.

biotic therapy started. In three days production was 70 lb., appetite was ravenous and during the first week of August the cow was awarded a championship in a Guernsey Cattle Show. During that lactation (365 days 3x A.R. test) this cow produced over 1,000 lb. of fat and over 20,000 lb. of milk.

Case 4. A Guernsey cow, freshened on March 3, 1955 and was treated intermittently for nine weeks for acetonemia. On May 6 a positive reaction was obtained with a metal detector and a magnet was administered orally. Milk production rose from 25.2 lb. to 37.9 lb. in six days, then dropped to 22.2 lb. on May 16. Death occurred on the following day. On necropsy a 1-in. small headed nail was found adherent to the magnet in the reticulum. The reticulum was adherent to the abdominal wall and diaphragm with areas of chronic induration and suppuration. The cause of death is believed to be caused by withdrawal of the nail from its embedded location. The entire contents of the digestive tract from the stomachs to the anus consisted of ingesta which was black, tarry, spongy, and consisted almost entirely of blood.

Case 5. A Holstein cow was treated on March 17, 1955 for constipation. A positive detector reaction was noted, but a magnet was not available to administer. Fifteen days later a magnet was administered even though the writer did not consider the outlook favorable. The animal died April 15 and the magnet was returned by the owner with the following story. He found the magnet and adherent nail in the stomach of the cow. The heart "sac" and thoracic cavity contained dark blood. The surface of the heart was damaged — lacerated.

Case 5. On Sept. 19, 1955 after averaging 45 lb. per day since April 30 a Guernsey cow went off feed, down on milk production, registered a temperature of 103.4 F. and a positive metal detector reaction. A magnet was administered orally and antibiotics parenterally. On Oct. 15 after a month of apparent improvement antibiotics were considered necessary and were administered for five days. Heart action at the end of this time was irregular and the



Courtesy Dr. J. A. Muffly

Magnetic retriever in a flexed position as it should appear in the rumen with the magnetic extending forward into the reticulum.

animal died on Oct. 19. On necropsy the only gross pathology was a fistulus tract in the reticulum, diaphragm, and pericardium and a traumatic infarct near the apex of the heart. The infarct was two inches in diameter, brown in color, friable, eroded in the center and only the intact endocardium prevented cardiac hemorrhage. The magnet and offending 1½ in. piece of bailing wire adherent to it were found in the reticulum.

Case 7. A Guernsey cow in which traumatic gastritis was diagnosed with the aid of a metal detector on June 25, 1955 was treated with a magnet orally and antibiotics parenterally. Her progress was irregular. On July 18 she was placed on a platform with only temporary response. On August 5, with a recently acquired Muffly Retriever[2], the magnet, several small nails, and a 5 in. piece of bailing wire were retrieved orally. On August 12 temperature was 103 F. and milk production 15 lb. Antibiotics were administered parenterally. The animal's appetite had improved and milk production was up to 25 lb. on August 30. This animal freshened again on April 9, 1956, was placed on A.R. test and during the 79 days produced 3,879.5 lb. of milk and 173.29 lb. of fat.

Case 8. On June 8, a Guernsey cow breathing laboriously and with an elevated temperature was treated with antihistamines and antibiotics parenterally. A history of previous attacks of respiratory distress was obtained. A positive metal detector reaction was observed and a magnet was also administered orally. Antibiotics were administered on several subsequent occasions but to no avail though the animal lived. The magnet was retrieved orally along with several small pieces of wire on Sept. 14. Two other small pieces of wire were found in the thoracic cavity on autopsy after euthanasia on October 28. Lungs were emphysematous and contained large areas of empyema and induration.

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2. Muffly, J. A., Nonsurgical Removal of Foreign Bodies with a Magnet. Proc. Book, A.V.M.A., 1955, p. 48.
3. Carroll, R. E., Magnets in the Control of Traumatic Gastritis. *Jour. Am. Vet. Med Assn.*, 127:311 (Oct.), 1955.

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Doctor Saulmon Named Assistant to Chief of USDA Animal Disease Eradication

Appointment of Dr. Ernest E. Saulmon as assistant to the chief of the U. S. Department of Agriculture's Animal Disease Eradication Branch, effective June 17, is announced by Dr. C. D. Van Houweling, director of livestock regulatory programs for the Department's Agricultural Research Service, of which the A.D.E. Branch is a part.

Doctor Saulmon was formerly stationed at Baton Rouge, La., as veterinarian in charge of animal disease eradication activities for the Department in Louisiana, a post he had held since March 1952.

His responsibilities in his new position in Washington, D. C., include planning and development of standby programs for control and eradication of foreign diseases of livestock, and the planning and organization of training courses for field personnel of the Branch throughout the country for rapid diagnosis of animal diseases that may threaten the Nation's livestock industry. Under Animal Disease Eradication Branch Chief Dr. R. J. Anderson, Doctor Saulmon will also serve as an area director of USDA livestock disease eradication activities in the Northwest, including the states of Washington, Oregon, Nevada, Idaho, Montana, and Wyoming.

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Complexity of feed formulae emphasizes the need for explicit feeding directions. Farmers should be cautioned to adhere carefully to manufacturers instructions regarding class of livestock for which specific hog feed is prepared, the quantity to be fed, and length of time to be continued.

The Health Department's Role In Promulgating A Brucellosis Law

EDMUND R. PRICE,* D.V.M., Jefferson City, Missouri

THE brucellosis program now being effectively enforced in Missouri by the Department of Agriculture was not consummated in a matter of months or even a few short years. During the late 1930's, progressive breeders and cattlemen promoted control legislation. As early as 1940, Missouri had its Brucellosis Committee. These committees, and there were several during the ensuing years, were able to get some beneficial legislation enacted, however, they did not have the full support of the Department. In some instances, good legislation was openly opposed by the Department of Agriculture.

In the spring of 1953, a young agressive man was appointed to the position of State Veterinarian. Also acquired by appointment was a dynamic Commissioner of Agriculture, who had the support of all agricultural groups. A state-wide Brucellosis Committee was appointed by this Commissioner in April of 1954, consisting of representatives from the agriculture and veterinary school, all breeder organizations, stockyards, community sales, milk associations, city and state health departments, and two large farm organizations. State and federal agriculture officials were advisors to the group. This group met five times to review the work of the Legislative Committee, which was made up of members of the larger committee. In addition to the State Committee, all counties had local committees. Meetings open to the public were held in every county. The legislation proposed became Senate Bill no. 170, and was introduced into the Senate in January of 1955. Some minor changes were made before passage, but these did not jeopardize the effectiveness of the bill. The bill was referred to the House, where it passed after lengthy debate without amendments. The vote was 121 to 6. It became law on August 29, 1955.

The federal report of 1951 revealed that 6.7% of Missouri cattle were positive to the blood agglutination test for brucellosis. In the spring of 1953, a cooperative control program was undertaken between the Missouri State Department of Agriculture and the Agricultural Research Service of the United States Department of Agriculture. The primary program consisted of ring testing of all dairy herds, with voluntary blood testing at the owners' expense, and an intensified calfhood vaccination program. The 67,000 dairy herds in Missouri were ring tested during the first nine months this program was operative. The results indicated that 37.7% of the herds in Missouri were positive. In 1955, 148,177 herd tests were made. By this time infection herd rate had dropped to 18.5%. During the same period (1955), 776,087 cattle were blood tested identifying 22,141 reactors, or an infection rate of 2.8%. From the results so far this year, it would appear that the rate will be less than 2% by January 1, 1957.

Educational Program

The Division of Health had strongly supported adequate legislation for years. In 1950 and the early part of 1951, members of the Division of Health held many conferences with the leaders of the previous brucellosis committees. It was decided in 1951 that the Division of Health should undertake a broad educational program. Four copies of the film The Triple Threat of Brucellosis were acquired, and through the efforts of the bureau of Health Education, these pictures were made available to all schools in Missouri, Parent-Teachers Association groups, farm, and civic organizations. Several hundred thousand people saw this film, not only in the rural areas, but in the urban areas as well. In this manner the full support of urban and rural legislators was encouraged. In many counties, health personnel used this picture as a primary part of their school health education program. In others, the health departments held area symposiums. Many radio and newspaper articles were prepared for local use. Thousands of pieces of literature were sent out by the

*Public Health Veterinarian, Assistant Bureau Director, Bureau of Communicable Diseases, Missouri Division of Health.

Bureau of Health Education in envelopes which carried the postmark add-plate "Stamp Out Brucellosis".

A second step was taken by the Division of Health in 1952. It consisted of a cross section milk ring testing survey. This survey was made by the Bureau of Laboratories and was conducted only in milk ordinance cities upon the request of the local health departments. Seven hundred and eight herds were tested in six cities with a herd infection rate of 38.2%. This compares favorably with results obtained in the first state-wide ring test conducted by the Department of Agriculture in 1953, which was 37.7%. These surveys revealed that grade A dairies, as a group, gave higher reaction rates than ordinary farm dairies, due largely, it is believed, to having a greater number of animals per herd, and the widespread use by veterinarians and dairymen of strain 19 Brucella vaccine. In addition, the Bureau of Laboratories was instrumental in having tests conducted in three larger metropolitan areas. The results obtained in these areas were comparable.

The third step was an attempt to ascertain the frequency of human brucellosis in rural areas, the probable mode of transmission, as well as the type of brucella most frequently involved. In March 1953, a program was inaugurated of making a complete epidemiological investigation on blood sera submitted to the Bureau of Laboratories for routine agglutination studies. Those persons whose titer were 1:80 or higher, were investigated. Our study area was confined to 18 counties of district 3, which are located in west - central, Missouri. This is a diversified farm area, a portion of which produces milk for the Kansas City market, however, most of the dairies are small and produce ungraded milk. Hog production is limited as is beef cattle raising. It was originally planned for members of the Bureau of Communicable Diseases to make all of the investigations, however, after conferences with the district 3 personnel, it was agreed that they could absorb this additional responsibility without seriously interfering with their routine work. In counties having nursing services, the request for investigations were forwarded to that county by the district office. fice.

The mode of investigation followed the customary procedure. First a visit was made to the physician submitting the blood specimen. If, in his opinion, it was not a chronic case, at least one additional blood sample was requested. Following the conference with the physician, an interview was held with the patient. In most instances, persons interviewed were requested to furnish a second blood sample. They were urged also to have both their cattle and hogs tested if the disease status of the animals was unknown. In some investigations, it was necessary to contact the veterinarian to get accurate information on the herd. The investigation was terminated on December 31, 1955.

Summary

Investigations attempted	66.
Investigations completed	62.
Mode of transmission—	
Due to animal contact (probable)	28.
Due to raw milk or raw milk products (probable)	7.
Chronic cases (physicians diagnosis)	20.
Other than brucellosis (physicians diagnosis)	4.
Persons reacting to diagnostic titers—	
Veterinarians	1.
Veterinary students	2.
Moved out of area	3.
Refused to give information	1.

Cultures were attempted on all specimens.

There were seven isolations with identification, all *Brucella abortus,* made from the 28 cases of probable animal contact. Two isolations, both *Br. abortus,* were made from the seven cases of probable raw milk origin, which gives a 25.7% recovery. Isolations were made from blood with titers ranging from 1:80 to 1:2560. The titer rose in one patient with positive culture at 1:80 to 1:5120 in five days and receded in five months to 1:80 and remained there. No clinical cases were reported in the households of the 35 acute cases except those who routinely came in contact with infected animals. Twenty-five of the probable animal contact cases cared for herds that were proved infected or not tested. Two cases were probably due to swine contact, one in a swine raiser whose two cows were negative and the other in a man who handled an orphaned litter of pigs. While handling the pigs, he infected a blister on his index finger that failed to heal. This was followed with a severe sore throat that would not respond to treatment. Four attempts were made to culture Brucella from these men. Of the 28 probable animal contact cases, 19 routinely drank milk from their herd. Twelve of the acutely ill did not have swine on the premises. With titers ranging as high as 1:640 in the so-called chronic cases, one may wonder as to the probability of some of these being re-

infections or continuously stimulated old infections. Of those which had a definite date of onset, none were less than four years old according to their physicians record. Isolations were attempted without success on 28 specimens sent in on these 20 chronic cases.

Conclusion

Brucellosis occurs in rural Missouri, and from epidemiological investigations in District no. 3, 80% of the acutely ill were found in those individuals having direct contact with infected animals or their discharges; 20% of the cases were attributed to the consumption of infected, raw milk or milk products. This is comparable to findings elsewhere in the Midwest, with the exception that in this area of Missouri the primary causative agent thus far isolated is *Brucella abortus*. Unlike other parts of the Midwest, chronic brucellosis appears to be quite prevalent in rural Missouri, accounting for more than 30% of the probable cases coming to the attention of physicians.

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New Plastic Needle for Continuous Intravenous Therapy

R. F. VIGUE, D.V.M., Springvale, Maine

Wide application of continuous intravenous fluid or blood therapy in large animals has been hampered by the lack of a simplified method of administration. The current technics are ambiguous and not clinically wieldly. During the past year, experience with the use of a recently developed plastic needle has been most gratifying.

The original Rochester plastic needle was developed primarily to satisfy the demand of physicians for a flexible, non-irritating needle which, because of its flexibility, could remain in the vein of patients for a long time thereby obviating the necessity for repeated venipuncture. The needle was proved to be well-tolerated. Because of its snugness in the tissues, the Rochester needle is not easily dislodged. This is one of the chief objections of the plastic tube method now in use, which must be introduced through the lumen of an oversized needle and therefore pulls out easily.

The Rochester plastic needle is constructed in this fashion: It consists of an ordinary intravenous needle over which is passed a hubbed segment of durable plastic tubing; the plastic cover is tapered perfectly with the point of the needle so that no resistance is met from the tissues when it is introduced into the lumen of the vein. Following insertion into the vein, the metal needle which serves as a stylet is easily withdrawn, leaving the plastic sheath as the permanent endovenous cannula. The plastic sheath is hubbed with a standard adapter and is ready to receive the infusion tube.

Varying sizes and lengths were evaluated. The optimal size was found to be 15-gauge in diameter by 6½ in. in length. The main advantages of the Rochester needle are: (1) Simplicity; (2) rapidity with which the drip method can be set up; (3) firmness with which the plastic tube is retained in the vein; (4) absence of mishaps during therapy; and, (5) non-toxicity.

By lubricating the plastic sheath with glycerine the stylet can be reintroduced and the needle used again.

(*Acknowledgements*: The assistance of Dr. J. H. Adler, Cornell University, in the development of this needle is appreciated. The Rochester plastic needle is manufactured by the Rochester Products Company, Rochester, Minn., and distributed by the Alexander-Shaw Corp., Natick, Mass.)

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Satisfactory fertility of frozen bovine semen appears to persist even during the third year of storage.

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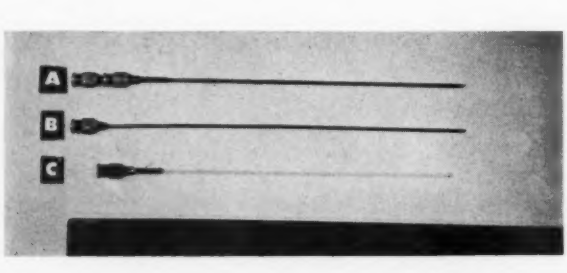

A. The modified Rochester plastic needle for large animal use. It consists of a 15-gauge X 6½-in. regular intravenous needle fitted with a hubbed plastic sheath which serves as the endovenous catheter (C).

B. The metal needle which serves as the stylet for introduction of the plastic tubing (C).

C. The plastic sheath which serves as the permanent endovenous catheter.

EDITORIAL COMMENTS

A.V.M A. San Antonio Convention

ANNUAL meetings of the American Veterinary Medical Association afford the opportunity to conduct the business of the national association each year. The agenda of the San Antonio meeting was prepared to consider the many complex problems facing the profession. These were discussed at length in sessions of the Executive Board, various Committee groups, and publicly as panel discussions during that portion of the meeting given to technical discussions. Participation of delegates pointed up interest in national affairs. From these democratic processes discussions will likely be based all future considerations. Free discussion and open debate assure soundness of resulting policies that determine achievements of organized veterinary medicine.

The lateness of the meeting and the long travel distance for many veterinarians held attendance to below 3,000. This was considerably below the 3,700 attendance record set last year at Minneapolis but was considered excellent representation judged by meetings of recent years. Veterinarians engaged in many fields located from coast to coast contributed to a well-planned meeting which consumed the interest of all. A visitor would have been impressed with the quality of technical material presented and the intentness of listeners.

Preconvention conferencs of groups organized within the A.V.M.A. structure were scheduled for selected dates. More of these were held during the general sessions. In addition to the all day preconvention conference on Sunday, October 14 to deal with matters of public relations, some 26 additional group meetings were held as luncheon or dinner conferences and evening sessions.

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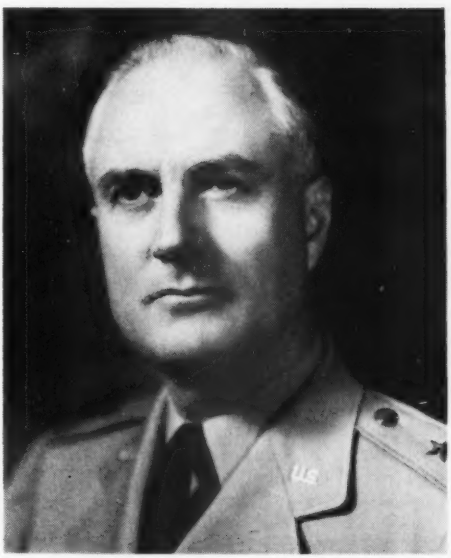
Production records of domestic animals means improved understanding of nutrition and management. A Yorkshire sow at the University of Minnesota Agricultural Farms farrowed 69 pigs in four litters and raised 56 of them within 18 months.

President of the A.V.M.A.



Brigadier General Wayne O. Kester

Brigadier General Wayne O. Kester, USAF (VC), Chief of the Air Force Veterinary Service, Washington, D. C., was installed as president in ceremonies at the closing general session of the 93rd annual meeting. General Kester was elected without contest as president-elect at the Minneapolis meeting in August 1955.

Nebraska farm born General Kester received his elementary and preparatory education in Nebraska and his D.V.M. from Kansas State College in 1931. After two years in practice, he was commissioned as second lieutenant in the Army Veterinary Corps as a result of successful completion of competitive entrance examinations. Assignments to posts, stations, and training schools followed in succession. He was stationed in Pearl Harbor during the Japanese attack on the Islands. During the war General Kester served as chief veterinarian, U. S. Forces, Pacific Ocean Areas and simultaneously as staff advisor to the Military Governor and later Governor of Hawaii.

In 1949, the then Colonel Kester was transferred to the Air Force and assigned to the office of the Surgeon General (USAF) as director of the newly

established Air Force Veterinary Service, a position he now holds. Under his brilliant direction a comprehensive and unique veterinary service has been developed as an integral part of the Air Force Medical Service. His approach in developing services for which veterinarians are especially trained and in establishing the position of veterinary science on the military public health team has greatly broadened the concepts and scope of military veterinary medicine. Practices initiated under general Kester's influence have set a pattern in the health field that has had universal effect in both civilian and military veterinary science.

Aside from military citations for distinguished service, General Kester was presented the Distinguished Service Award in Veterinary Medicine at Golden Anniversary Ceremonies of the School by President James A. McCain of Kansas State College.

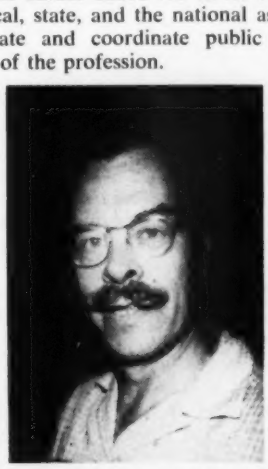
The President's Address

Dr. Floyd Cross, retiring president, recommended comprehensive surveys of veterinary services in many fields to determine the relative position of such services and their potential. From information accumulated direction of effort and plans for the future might be laid with confidence that the kind of veterinary service to meet demands of society would be available when needed. A continual study estimate must be made from surveys of many sorts, including trends in livestock diseases, for guidance of educators and leaders who are conscious of the influence of the ever-changing situation.

Doctor Cross referred to election procedure and efforts toward devising means which will allow for every member to cast a ballot for elective officers. He emphasized also the importance of public relations within the profession, with allied professional groups, and the general public.

Officers Selected for 1956-57

Brigadier General Wayne O. Kester, USAF (VC), was installed as president during the closing session on Thursday forenoon. General Kester earlier called for closer liaison between local, state, and the national association to facilitate and coordinate public relations activities of the profession.



Mr. Walter Lawrence, Technical Director of closed-circuit television programs made possible by the generous support of Allied Laboratories, Inc., in cooperation with the Radio Corporation of America.

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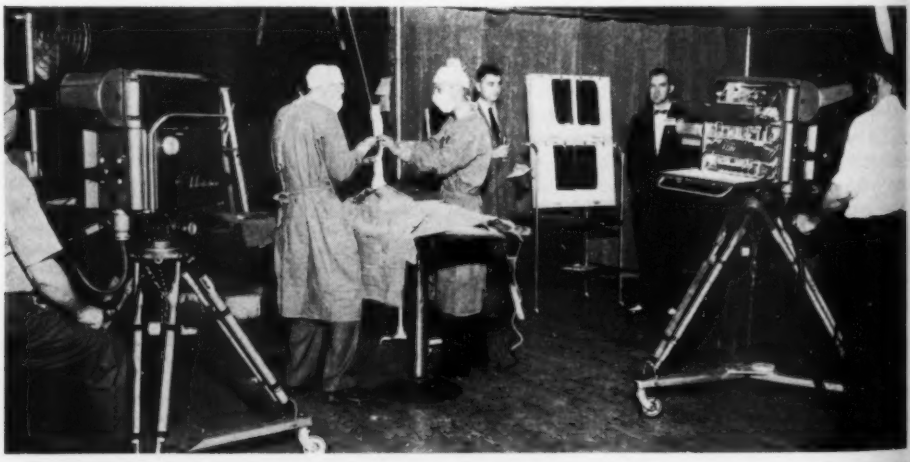

General view of television studio for small animal clinic during a presentation of surgical demonstrations.

Dr. W. W. Armistead, dean, School of Veterinary Medicine, Texas A. & M. College was elected president-elect on ballot vote. When installed as president at Cleveland, Ohio in 1957 he will be the second president from his state and the first since the late Dr. N. F. Williams, state veterinarian of Texas, who was elected at the Atlanta, Ga. convention in 1932. At that meeting a total of 600 registered, which too was nearly double preconvention estimates.

Five vice-presidents, one from each of four zones (apportionment of areas for A.V.M.A. conventions) and one at large were elected without contest except for Zone 2. In an open election Dr. Mark Allam, dean, School of Veterinary Medicine, University of Pennsylvania was selected. Others include: Dr. K. M. Curts, Kansas City, Kans., Dr. Kenneth Whittington, Memphis, Tenn., Dr. C. U. Duckworth, Berkeley, Calif., and Dr. Martin D. Baum, Denver, Colo.

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Scientific Programs

Organization of the literary program followed the proved pattern of previous years. Two General Sessions, the first in the forenoon of the first day and the second in the forenoon of the final day, opened and closed formal presentation of scientific papers. Most of these were read before one of the six organized sections. These were: General Practice, Research, Small Animals, Poultry, Surgery and Obstetrics, and Public Health. Section meetings were lead by chairman and secretary selected by the groups at the previous meeting.

Television programs were presented again this year by the Allied Laboratories and the Radio Corporation of America. Mr. Walter Lawrence's efficient organization again this year handled the media's technical aspect. Dr. L. E. Fisher, coordinator, performed in his usual dependable style. These presentations highlighted the closing general session, both sessions of the General Practice and Surgery and Obstetrics and Small Animal Sections and one each of the sections on Public Health and Research.

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About three-fourth of all veterinarians in general practice are actively engaged in organized state and federal projects aimed at brucellosis eradication.

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Losses caused by parasites of livestock is rapidly approaching $1,000,000,000. annually.

Dean W. W. Armistead Elected President-Elect

Dr. W. W. Armistead, dean of the School of Veterinary medicine, Texas A. & M. College, College Station, Texas was elected by ballot vote to serve the A.V.M.A. as president-elect for 1956-57.

Born in Columbus, Ohio in 1916, Doctor Armistead attended public schools in both his birth place and adopted home — Houston, Tex. He received his veterinary training at Texas A. & M. College, graduating in 1938. He entered practice associated with Dr. W. G. Brock of Dallas, Tex. immediately following graduation and remained there until September 1940 when he accepted a position as instructor in veterinary medicine and surgery at his Alma Mater. His work at Texas A. & M. was interrupted in August 1942, when he was called to active duty as first lieutenant in the Veterinary Corps.

He served at a number of stations in the United States and with a veterinary general hospital and veterinary evacuation detachment in Italy. Returning to Texas A. & M. College he was promoted successively to professor in 1947. Leave from teaching assignments allowed Dean Armistead to do graduate work at Ohio State University (1949-50) where he was granted a Master of Science. He received a Ph.D. from the University of Minnesota after completing work in the graduate school at St. Paul, Minn. He was promoted to dean and head of the School of Veterinary Medicine in Texas in 1953.

Dean Armistead has taken active part in organized veterinary medicine during his phenomenal professional career. He was president of the Texas State Veterinary Association in 1947-48.

Versatile in many accomplishments including those of clinician and lecturer, Dean Armistead will lend prestige and firm leadership to the national association.

Dr. L. E. Fisher, Berwyn, Ill., served as coordinator of television demonstrations.

Virus Diarrhea and Mucosal Disease

Virus diarrhea and mucosal disease of cattle are synonymous or closely related disease entities, according to report by Dr. W. R. Pritchard and Dr. R. G. Carlsen. The two diseases resemble each other both clinically and pathologically.

Virus diarrhea may be acute or chronic. It is contagious and infectious characterized by fever, nasal discharge, cough, diarrhea, dehydration, inflammation of the mucous membranes of the alimentary tract, and swelling of lymph nodes. Cattle only appear to be susceptible. In outbreaks as high as 85 to 100% of exposed cattle are affected causing death rates ranging up to 50% of those stricken.

Segregation of infected animals is the only recommended means of control. No treatment so far employed appears to alter natural course of infection.

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Prednisolone for Bovine Ketosis

Prednisolone (delta-1-dehydrohydrocortisone) is a synthetic analogue of hydrocortisone. It is claimed to be effective in 1/5 to 1/3 the dose of hydrocortisone.

The use of this new steroid for the treatment of bovine ketosis offers advantages over some other treatments because of ease of administration and rapid physiological effect, according to a group of University of Illinois researchers in a report presented the General Practice section combined with that of Surgery and Obstetrics. They stated that 87% of cows suffering uncomplicated ketosis recover following a single treatment.

Plant Poisoning in Drought Areas

Excessive nitrate content of certain plants on which livestock graze is an increasingly important cause of poisoning in farm animals, according to a report presented by Dr. Arthur Case, School of Veterinary Medicine, University of Missouri, Columbia.

Forage plants such as oats, sorghums, corn, and certain weeds have long been known to cause losses, especially in cattle, because of nitrate concentration in the plant during adverse growing conditions. The combination of heavy fertilization of these crops and drought conditions has brought about many cases of poisoning by plants usually considered safe for forage, Doctor Case stated. Corn has caused heavy losses of cattle which grazed in drought-stricken fields.

Symptoms of this type of poisoning vary from abortion and decreased production to severe intoxications that soon end in death. Severity of symptoms depend upon the amount of nitrate in the ration, as well as the quality of the entire ration.

To prevent losses, Doctor Case said the entire soil fertilization program should be re-evaluated and if possible, the use of irrigation should be considered, to reduce the problem of nitrate concentration by plants. It might also be wise to have chemical analyses made of plants that could possibly have excessive nitrate content, to avoid losses, he said.

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Value of Veterinary Service

A survey conducted by a special Committee of the A.V.M.A. reported that each dollar spent on veterinary service returned $5.78 to the livestock owner.

The survey was conducted among veterinarians in 31 states, all of whom were under instructions to place conservative values on the animals saved or the losses prevented through medical service. No attempt was made to measure the value of veterinary service for brucellosis or tuberculosis testing.

"It can be stated with certainty that the livestock industry in the United States, would not be possible were it not for the diagnosis, immunization, and other control measures exercised by the veterinary profession for the control of infectious diseases."

A test has been developed which will identify poultry breeding flocks that are free of the organisms essential to continuing infection with chronic respiratory disease.

Veterinary Medicine

Small Animal

SECTION

THERAPEUTICS • MEDICINE • SURGERY

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Clinical Spinal Conditions Of The Dog†

B. F. HOERLEIN,* D.V.M., Ph.D., Auburn, Alabama

SMALL animal clinicians have recognized for years the variety and complexity of spinal conditions in the dog. McGrath[1] has reported that of 932 dog autopsies, 273 had had a history of central nervous disturbances of which 69 (29%) suffered from paresis or paralysis of an extremity due to cord involvment. However, in spite of the importance of spinal conditions, there is remarkable paucity of information on the subject in veterinary literature. The author will endeavor to outline conditions recognized clinically as a guide in their differential diagnosis.

Inflammatory Conditions of the Cord and/or its Coverings

Infectious. 1. Toxoplasmosis[2] is a protozoan disease of man and a host of animals which may affect the central nervous system. It may cause a variety of neural symptoms such as irritability, incoordination, paresis, paralysis, and convulsions. In the literature review by Jasper[3] of ten canine cases, two had brain lesions. There is no known effective treatment.

2. Rabies[4] is a neurotropic virus disease which has been described definitively in veterinary literature. Spinal symptoms of paresis and paralysis are observed in this condition as well as brain symptoms.

3. Canine distemper is undoubtedly the most viscious infectious disease of the dog. The neural form of the disease can cause a great variety of symptoms varying from circling, weakness, paralysis, chorea, to convulsions. In the diagnosis of any neural condition, it should be differentiated from nervous distemper. Of course the prognosis of this disease in its nervous form is guarded to unfavorable. The treatment is largely supportive.

Non-Infectious. 1. Meningitis is rarely seen in the dog as a primarily infectious disease. Meningococcal, tubercular, syphylitic meningitis as seen in man are not a problem in the dog. Meningitis in the dog can occur as an involvement as part of an infectious disease in such conditions as distemper, toxoplasmosis, and cryptococcosis.

However, suppurative meningitis may occur as a metastatic infection from other areas by the blood stream or by extension along preformed anatomical pathways such as the middle ear, nasal sinus[5], or paravertebral veinous drainage of the pelvis. Hyperesthesia, rigidity, fever, opisthotomus, and convulsions frequently are symptoms. Foreign materials (pantopaque, lipiodol, etc.) introduced into the subarachnoid space will produce a temporary subclinical leptomeningitis[6]. Diagnosis depends on spinal fluid findings of increased cell count and protein content. The treatment is directed at the cause. Antibiotics should be used with a combination of chloromycetin and sulfonamides being a favorite choice of this writer. Extremely high level penicillin is used frequently.

2. Dural ossification or pachymeningitis ossificans is according to some authors[7, 8] largely due to a form of metaplasia and probably related to senility. However, since these lesions

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are found most frequently in the most movable parts of the spinal column such as the neck and lumbar segments, low grade inflammation may certainly be contributory. It is for the latter reason that the condition is placed here in the outline.

This condition is characterized by bony plaques deposited usually on the inner surface of the dura mater (Fig. 1). The condition is

Fig. 1. Dural ossification. Here the bony plaques are demonstrated on the inner surface of the dura mater after removal of the spinal cord.

peculiar to the dog and is seen in larger breeds (German Shepherd, Collie, Great Dane, St. Bernard) during middle or old age. The clinical cases as observed by the author have been largely confined to the German Shepherd and have shown progressive symptoms of pain, paresis, paraplegia, urinary and bowel dysfunction. Treatment is supportive or symptomatic having an unfavorable outcome.

3. Canine encephalomyelitis of the type called "old dog encephalitis" is a condition of adult and old dogs characterized by disturbances of locomotion, vision, and "dummy like" symptoms. Cordy[8] has described inflammatory changes histologically as well as inclusions, however transmission attempts have failed. No specific treatment is known.

4. Myelitis or inflammation of the spinal cord itself does not apparently present a problem except as a part or result of other conditions. Distemper myelitis is seen frequently. Focal or diffuse myelitis can be the sequelae to fractures, protruding discs, concussions, and dislocations.

Concussion myelitis is a result of a general "shaking up" of the nerve elements. This phenomenon might be due to a rather vague or mild trauma and spinogram findings might be entirely negative. However, concussion may result in an irreversible neurochange and permanent paralysis. The histopathological appearance may present diffuse subarachnoid and medullary hemorrhage as well as scattered myelomalacia and demyelination.

5. Osteomyelitis and other types of bone inflammations or infections of the spinal column do occur. They are usually due to trauma which introduces a bacterium or some other agent. The exostosis caused by such a process in turn causes pressure on the spinal cord and characteristic symptoms. Usually treatment is not recommended because of the advanced nature of the condition (Fig 2).

6. Spondylitis or inflammation of the vertebral column is a rather specific condition characterized by a certain type of periosteal exostosis. The typical lesion is a ventral "spur" or "bridging" effect on the ventral surfaces of the vertebra at the intervertebral spaces and is called deformative ossifying spondylitis (spondylitis deformans ossificans)[9]. As the condition progress the vertebral joints and ligaments become completely ossified and ankylosed. Undoubtedly the "wear and tear" on spinal structures over a long period causes a low grade inflammatory change, which along with senile muscle atrophy may cause mild to

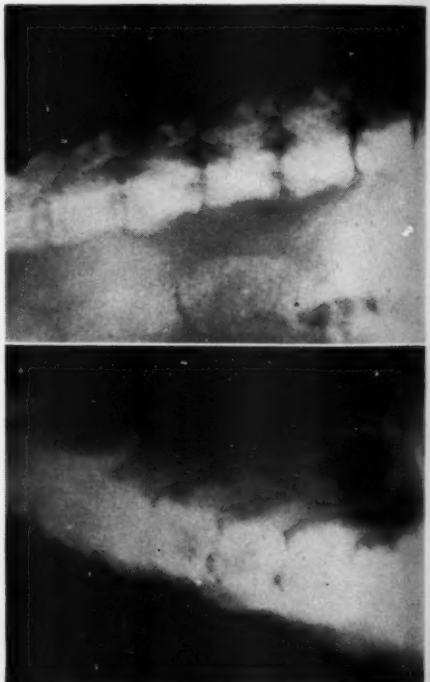

Fig. 2. A lateral view of the lumbar vertebrae affected with osteomyelitis. Notice the fuzzy looking bone. Lower — ventrodorsal view.

moderately severe symptoms. The symptoms are similar to other compressions of the cord and nerve roots and vary from pain to paralysis. Symptomatic treatment should be used (Fig. 3).

7. Post-vaccination rabies paralysis is a multiple disseminating encephalomyelitis of the demyelinating type. This condition with other demyelinating myelitis might be classified as a degenerative condition.

This condition of posterior paresis which may advance to general paralysis and death is seen 2-3 weeks after inoculation of phenolized brain tissue rabies vaccine. Jervis[10] and workers have reproduced the condition experimentally with this type vaccine. Treatment should be symptomatic and the prognosis is unfavorable to grave. Clinically, this occurrence is not observed frequently.

Degenerative Conditions of the Cord and/or its Coverings

Nutritional Deficiencies. 1. Avitaminosis A[11] and B complex[12,13] are the usual causes of nervous disorders. Niacin and thiamin especially, if greatly deficient can cause weakness, incoordination, tremors, and even convulsions. However, gross malnutrition in the dog is not seen nearly so frequently now as in years past. One should bear in mind that deficiencies in protein, vitamins A and B, and mineral (Ca,P) can contribute to nervous dysfunctions in case of disease, old age, and even traumatic injuries. Many of our senile neural disorders have nutritional aspects. The treatment is centered on supportive measures and high level therapy of the deficient item.

Other Degenerative Conditions. 1. Multiple sclerosis might be termed a degenerative change in the central nervous system since it is a chronic, slowly progressive disease characterized by demyelination. This condition has been described in dogs by Nieberle and Perdrau,[14] while others feel that its occurrence as a distinct entity in dogs is yet to be proved.

Parasitic

Larval migration in nervous tissue will cause nervous dysfunction. Although microfilaria migration in nervous tissue has not been reported in the dog as it has in goats and sheep,[15] it probably will in the future.

Tick paralysis is a frequent condition in the dog in some areas due to a neurotoxin secreted by *Dermacentor variabilis*,, the common wood tick, usually. The symptoms vary from

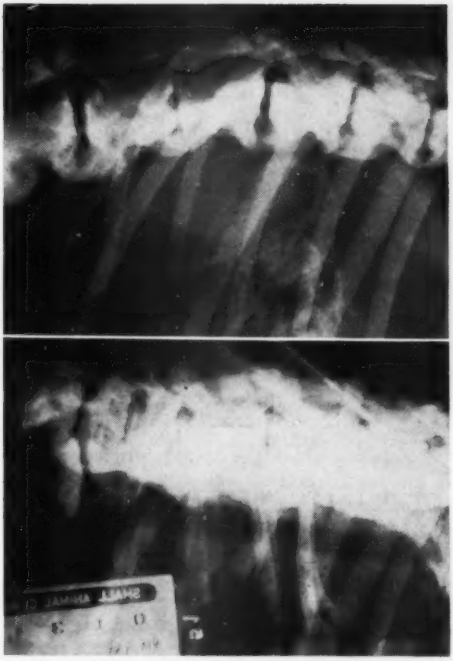

Fig. 3. Deformative ossifying spondylitis of the lumbar and thoracic vertebrae. Lower — ventrodorsal view.

a weakness to a flaccid paralysis starting in the hind legs and finally causing tetraplegia. Removing the ticks, dipping the dog, and supportive treatment usually affords a prompt recovery.

Hereditary Spinal Conditions

Syringomyelia is chronic progressive disease of the cord and brain characterized by cavitation and gliosis. Although there is controversy as to the cause it seems that the consensus (in man) is that it is a developmental anomaly.[16] McGrath[5] states that it is seen most frequently in the dog as a result of inflammation or injury. It is characterized clinically by sensory loss, muscle atrophy, and spastic paralysis. No treatment is known.

A hereditary lethal factor producing paralysis in the dog has been described by Stockard[17] in cross-breeding St. Bernard and Great Danes, and Great Danes and Bloodhounds. Occasionally a similar clinical condition has been seen in inbreeding other breeds.

A hereditary spondylitis has been reported in man[18] and similar conditions may exist in the dog.

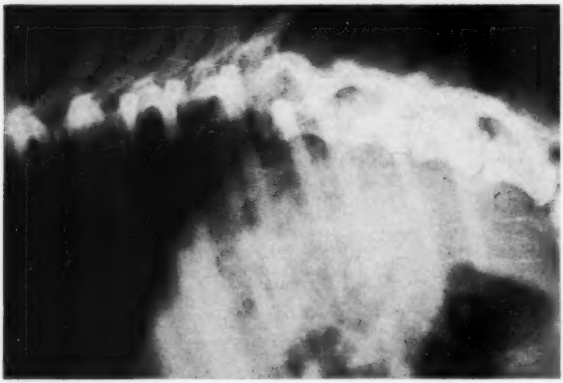

Fig. 4. A spinal fracture in which treatment would be ineffective because of the severe damage to the spinal cord.

Compressions

Compressions of the spinal cord form one of the most frequently observed categories in this outline. Compressions can be classified into; (a) extravertebral and (b) vertebral.

Extravertebral compressions are lesions which originate in structures adjacent to the vertebral column, and by their pressure on the vertebrae over an extended period cause necrosis of the bone. This lesion then places pressure on the cord. Such lesion might be tumors, abscesses, aortic aneurisms, and cysts.

Vertebral compressions are usually traumatic in origin and fractures or luxations comprise the largest group. McGrath[1] observed ten cases of 79 canine spinal afflictions to be fractures or luxations. These displacements cause a compression on the cord and usually a spastic, then flaccid, paralysis. Evidence of spinal shock resulting from the compression may be seen anterior to the lesion and is manifested by spastic neck and forelegs. The diagnosis and prognosis of these conditions depend largely on radiographic and clinical signs.

If the fracture is a compression type and is not producing a severe pressure on the cord, reduction and immobilization by means of plates and bolts on the dorsal spines is effective. If surgery is to be considered it should be accomplished as promptly as possible, within a few hours at least. Pressure on the cord should be removed by a laminectomy.[19] (Fig. 4).

Protruding intervertebral discs cause pressure on the cord and appropriate symptoms. This may cause pain, paresis, spastic or flaccid paraplegia, or an acute myelitis which results in death. In susceptible breeds such as the Cocker Spaniel, Dachshund, Pekingese and Beagle, the disc undergoes a premature degeneration and a slight traumatic incident may cause the lesions. Any breed can be affected by severe trauma. The treatment may be conservative or surgical. If surgery is to be done on severe cases, it should also be done as soon as possible.[20,21,22] (Fig. 5).

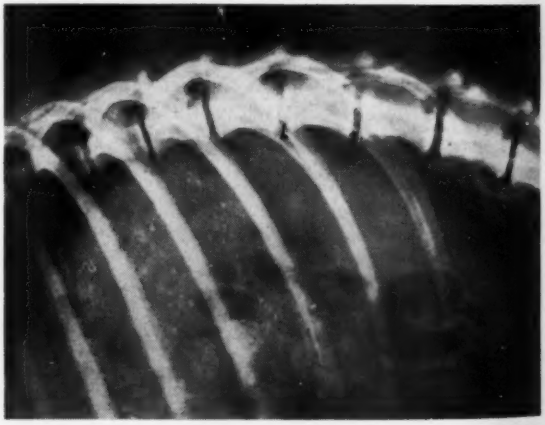

Fig. 5. Disc protrusions paraplegia. 1. calcified disc, 2. the recently ruptured disc causing compression on the cord.

Tumors

In the writer's opinion, tumors of the cord and the meninges occur relatively infrequently. They will demonstrate a variety of symptoms depending on the location and size.

Tumors of the vertebrae have been observed. Osteogenic sarcomas, multiple myelomas, and others have been seen to cause compression type symptoms. Most tumors are inoperable by the time they are presented for treatment, but are of diagnostic and prognostic importance. (Fig. 6).

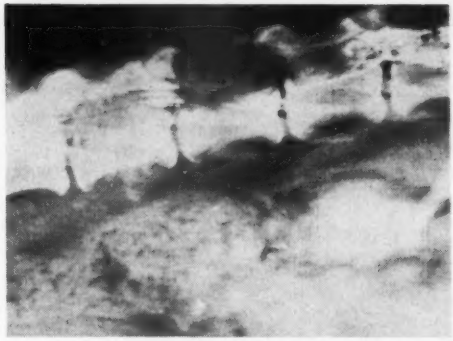

Fig. 6. Multiple myeloma causing a compression myelitis. Pontopaque has largely been halted in its caudal migration.

Malformations of the Spinal Cord or Column

Occasionally these conditions such as spina bifida, rachischisis, rachisele, and hypoplasia occur in the dog. Fortunately they are rare and present little clinical problem. The writer has seen absent vertebrae and fused vertebrae as a cause of spinal symptoms frequently. These anomalies are diagnosed accurately only by radiography. (Fig. 7, 8).

Vascular Conditions

Primary spinal vascular conditions do not form a major entity in dogs. Often epidural, subarachnoid, or medullary bleeding may occur subsequent to trauma. Since venous sinuses have numerous dilations and carry relatively slow moving blood, it is conceivable that thrombosis could occur.

Miscellaneous

Working and country dogs in general, frequently are admitted to a clinic with a partial paraplegia or tetraplegia. Coon and Fox Hounds may develop this condition after a hunt. Often the cause is a mystery; physical examination, blood and urine studies, and radiographic examinations reveal nothing abnormal. Usually affected animals recover in from two to 30 days with the average of perhaps two weeks. The treatment may be largely rest, laxative, calcium, B complex vitamins, and other symptomatic treatment.

Many veterinarians have termed the above condition as botulism. Probably most of these cases are an enterotoxemia, botulism, or a type of food poisoning. These cases have usually recovered very slowly and have been affected with a characteristic flaccid tetraplegia.

Summary

A brief but fairly complete outline of spinal conditions of the dog is presented. Prompt diagnosis and surgical correction is effective on some of the traumatic conditions such as protruding discs, fractures, and luxations. Many

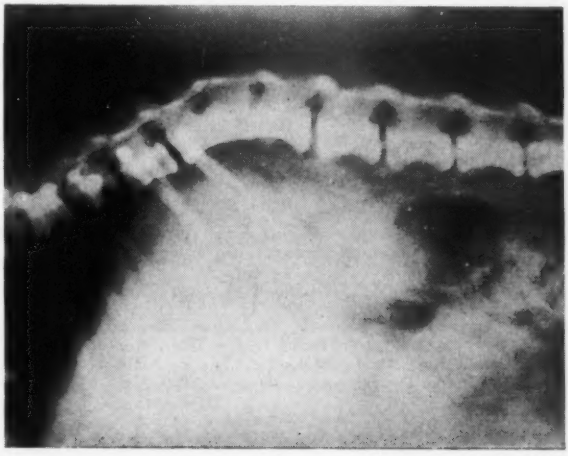

Fig. 7. Congenitally fused 13T, 1L & 2L vertebrae.

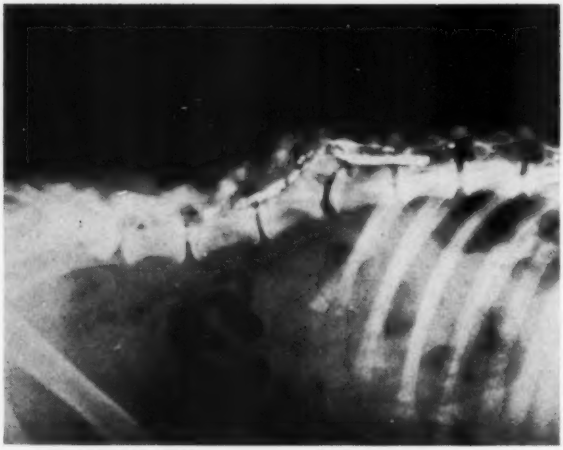

Fig. 8. Congenital malformation of the spinal column. Notice that two lumbar vertebrae are entirely absent and one is short and dorsally misplaced.

of the spinal conditions are of little therapeutic importance because of the degenerative and non-reversible nature of the disease. However, these conditions are extremely important from a diagnostic and prognostic viewpoint. The practitioners reputation depends as much on these latter functions as on the therapeutic aspects.

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Dog Ruled Weapon

A huge German Shepherd police dog accused of attacking three New York patrolmen was ruled to be a "weapon" in a felony court hearing recently. The dog's master was charged with violation of the Sullivan weapons law because of his possession of the 100-lb. animal. Policemen who attempted to arrest the "weapon's" owner were knocked down and unceremoniously rendered noncombative. The dog's owner was later booked for violation of the Sullivan weapons law.

Oral Use Of A New Antibiotic In Dogs And Cats

KENNETH B. HAAS,* D.V.M., NOLEN D. CONNOR,* D.V.M., M.S., and J. LAVERE DAVIDSON,* D.V.M., Kalamazoo, Michigan

ALBAMYCIN® (novobiocin), a new antibiotic developed in the Research Laboratories of The Upjohn Company, is produced by *Streptomyces niveus nov. sp.* This paper will discuss briefly antimicrobial spectrum, chemistry, absorption, distribution, and excretion of albamycin following administration, and its indications and dosages for dogs and cats.

Antimicrobial Spectrum

Albamycin is active against both Gram-positive and Gram-negative bacteria (table 1). It is bactericidal at about two times the minimal inhibitory concentration and addition of blood or serum to culture broth decreases the inhibitory effect of the antibiotic *in vitro*. Increasing acidity of the media increases progressively the activity against *M. pyogenes var. aureus* and Proteus.

The antibiotic is also active against Gram-positive and Gram-negative experimentally produced bacterial infections in mice, active against *M. aureus, Streptococcus hemolyticus, Diplococcus pneumoniae, Proteus vulgaris, Pasteurella multocida, Salmonella typhosa,* and *Klebsiella pneumoniae.* It is especially active against *Micrococcus pyogenes var. aureus* (table 2).

In vitro studies, employing the serial passage procedure, demonstrate that *M. aureus* may develop resistance to albamycin as with other antibiotics. Such resistance, however, has not been reported to occur with clinical use. No cross resistance is demonstrated with any of the following clinically useful antibiotics: Erythromycin, penicillin, streptomycin, chlortetracycline, oxytetracycline, tetracycline, or chloramphenicol.

Chemistry

Crystalline albamycin is light yellow to white. Most antibiotics produced by actinomycetes are basic (streptomycin, streptothricin, erythromycin, and neomycin) or amphoteric (tetracycline, chlortetracycline, oxytetracycline) in character; albamycin is acidic, as is penicillin, and is stable to the degree of acidity or alkalinity found in the gastrointestinal tract.

The antibiotic is freely soluble in water at room temperature in amounts in excess of 1,000 micrograms/ml. The resulting solution has a pH of about 7.5. It is essentially stable at this pH at refrigerator temperatures.

TABLE 1. *In Vitro* Activity of Albamycin

	M.I.C., micrograms/ml.
Organism: Gram-positive	
M. aureus	0.1
S. hemolyticus	3.1
S. hemolyticus	0.78
S. fecalis	1.56
S. uberis	6.2
S. agalactiae	0.39
D. pneumoniae	1.56
C. novyi	25.0
M. albus	0.2
B. subtilis	1.5
C. diphtheriae	0.04
L. monocytogenes	1.5
B. anthracis	1.0
Gram-negative	
A. aerogenes	12.5
A. aerogenes	50.0
E. coli	50.0
E. coli	> 100.0
P. vulgaris	> 100.0
P. vulgaris	25.0
P. vulgaris	6.2
P. vulgaris	15.0
P. vulgaris	3.1
P. morgani	400.0
P. morgani	50.0
H. influenza	0.39
Ps. aeruginosa	> 400.0
Ps. aeruginosa	> 100.0
Pseudomonas sp.	> 400.0
Pseudomonas sp.	12.5
S. paratyphi B	> 400.0
S. typhi TG3	12.5
K. pneumoniae	6.25
K. pneumoniae	100.0
P. multocida	1.56
S. flexneri	> 100.0
S. enteriditis	50.0
Shig. flexneri	50.0
Malleomyces mallei	3.0
P. pestis	30.0
Brucella suis	3.0
Bacterium tularense	3.0
Acid-fast	
M. tuberculosis H37Rv	2.5

*Veterinary Medical Department, The Upjohn Company.

®The Upjohn Company brand of novobiocin (formerly streptonivicin). Unless otherwise designated, the mono-sodium salt was used in these studies.

TABLE 2. *In Vitro* Activity of Albamycin Against Strains of Micrococcus

Strains of M. pyogenes var. aureus	M.I.C., micrograms/ml.
4477	0.02
L-40	0.04
M-1	0.39
284	0.04
S82-N6	1.5
S126-N4	0.09
Smith	3.1
R-7	0.19
L-124	0.19
M-20	0.19
D-52R M-1	0.19

Dry albamycin monsodium is believed stable for at least two years at room temperature, while concentrated aqueous solutions lose about half their biological activity at room temperature in about a month. Reconstituted preparations are stable for at least 30 days under refrigeration.

Pharmacology

Absorption. Albamycin is unique among antibiotics for its property of high absorption following oral administration. It is stable under acid, neutral, or alkaline conditions and appears to be unaffected by passage through the stomach. Peak concentrations are produced in the blood of dogs within two to four hours, which on an equivalent weight basis are approximately ten times higher than those produced by tetracycline, 25 times higher than erythromycin, and 50 times higher than penicillin. The fact that this antibiotic is acid-stable, and hence not likely to be destroyed by the stomach, probably accounts in part for the high serum levels attained. A composite graph demonstrating comparative levels in dogs is presented in fig. 1. High antibiotic levels are present at eight hours and detectable amounts remain in the serum for as long as 24 hours. This is also unusual and may be due to reabsorption of the antibiotic excreted via the bile and also, perhaps, to the loose binding of albamycin by serum proteins. Serum concentrations in dogs are presented in table 3.

Distribution. Following oral administration, albamycin is widely distributed throughout the body tissues and fluids of dogs. When appreciable amounts are present in the serum, the antibiotic diffuses into the pleural and ascitic fluids. It does not readily diffuse into cerebrospinal fluid. The drug appears to be concentrated in the liver and excreted in the bile.

Excretion. Albamycin is excreted in the feces and urine. The concentration in the bile is approximately 16 times that in the serum and urine. Approximately one-third of an orally administered dose is accounted for as biologically active material in the feces. Only about 1/100 is present in the urine.

Toxicity. As determined by tests in mice, guinea pigs, dogs, and cats, albamycin has a low order of toxicity. Clinical studies thus far indicate that it does not cause kidney or liver damage. Only minor alterations were noted after 62-day chronic toxicity studies in dogs, and 72-day chronic studies in cats demonstrated no evidence of eighth nerve toxicity (hearing and postrotational nystagmus) nor were any drug-related systemic lesions observed at necropsy.

Indications and Dosage

Albamycin is indicated in the treatment of streptococcic, staphylococcic, and Proteus infections, particularly in dogs and cats allergic to other antibiotics and in infections in which the organism is resistant to other antibiotics. Use of this antibiotic in infections caused by organisms other than staphylococcus will depend on the sensitivity of the particular organism and the clinical conditions pertinent to the animal patient. Usefulness has been clinically demonstrated in a wide variety of canine and feline infections: Abscess (septicemia), bronchitis, cystitis, metritis, nephritis, parotitis, pharyngitis, pharyngotonsillitis, pneumonia, prostatitis, staphylococcal skin infection, tonsillitis, and wounds. The beneficial therapeutic effects achieved in cases of canine distemper, hepatitis, and paradistemper, and in feline panleukopenia and pneumonitis must be attributed to control of secondary invaders rather than specific antiviral effect.

The tentatively recommended daily oral dose in dogs and cats is 30 mg./kg. (2.2 lb.) of

TABLE 3. Serum Concentrations of Albamycin in Normal Canine Subjects after Oral Administration of One Dose

	Albamycin in micrograms per cc. of serum — hours after administration					
Dose-Time	1	2	3	4	6	8
10 mg./kg.	9.0	26.0	18.0	11.0	4.5	2.5
40 mg./kg.	$\geq$44.0	$\geq$60.0	$\geq$112.0	$\geq$112.0	$\geq$96.0	$\geq$32.0

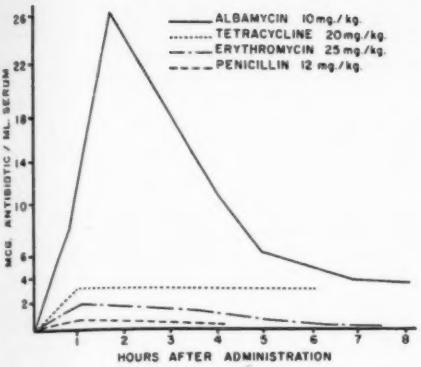

Fig. 1. Comparative serum levels of albamycin, tetracycline, erythromycin, and penicillin following oral administration to dogs.

body weight, in divided doses and continued for at least 48 hours after the temperature has returned to normal and all evidence of infection has disappeared.

Summary

Albamycin is a new antibiotic active against certain Gram-positive and Gram-negative bacteria. It is especially active against *M. pyogenes*. It is unique for its property of high absorption following oral administration, levels persisting beyond eight hours. It is eliminated in the bile and urine.

Indications include a wide variety of infections of dogs and cats. Dosage is 30 mg./kg. orally in daily divided doses.

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Mark L. Morris: Animal Memorial Foundation

The novel Foundation with executive offices at 505 Mile High Center, Denver, Colo. outlines its purposes in an attractive brochure. Essentially these are based on the premise that "for years animals have been tools of research into human ills; it is about time a little was done for the animals themselves."

Included are brief outlines of investigations now under way at a number of research centers throughout the country, cost of which is being underwritten by Foundation funds. These and other activities dedicated to animal welfare and supported by contributions and gifts, are supervised by the Advisory Board and Trustee who serve without compensation.

Details may be secured at the Foundation's executive office.

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Biting Dogs

Questions have been raised about the responsibilities of veterinarians when a person has been bitten by; (1) a dog of unknown origin and destination — in other words a "wanderer", and (2) when the dog is a neighboring animal.

In most states there are regulations or laws pertaining to rabies, and usually there is in such a law a clause making it obligatory to report to health authority by anyone having knowledge of the biting. Furthermore, if the veterinarian is consulted when a human being has been bitten by a "wanderer" so that a history of the dog can not be obtained, nor so it can not be confined and observed for a two-week period, it is clearly the responsibility of the practitioner to report all the known facts to the physician so that the latter may use his judgment as to whether or not to apply rabies prophylaxis. In a measure the same procedure is followed when a neighbor's dog is involved, though an observation period of ten days to two weeks is of decided value in clarifying the situation. In our opinion it has been customary when a human being has a penetrating-skin laceration or deeper — the thing to do is to advise prophylactic vaccination — at least until observation of the dog demonstrates freedom from the disease at the time of the biting.—*R. R. Dykstra, D.V.M.*

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Appliance to make self motile dogs suffering posterior paralysis assure improved results since exercise is encouraged.

Selling The Veterinary Profession

WILLIAM R. KLEMM,* Auburn, Alabama

HAS the veterinary profession sold itself short? Or perhaps more pertinent, has the profession failed to sell itself? Is the public educated on veterinary medicine's role in modern society? And can that role be publicized within the bounds of professional ethics?

As a student of veterinary medicine, this writer has observed a marked tendency among associates to shun publicity connected with the profession. This feeling is manifest in the thinking of students, faculty members, and practitioners. In a few isolated cases there is an actual fear of publicity.

The explanation for any such attitudes is not easily analyzed. However, some facts have emerged from an investigation into the matter. For example, some fear that publicity cheapens the profession. Others fear that it is unethical. And others, though not opposed to publicity, feel that it serves no constructive purpose.

Before proceeding with these considerations, the meaning of the word, "publicity" should be understood. As used here, the word refers to any dignified means by which the veterinary profession can be elevated in the public esteem.

In answer to the charge of publicity being unethical let us remember that the primary aim of professional ethics is to preserve dignity for the profession and provide optimum service to the public. Properly handled, publicity can help establish that dignity and inform the public on veterinary services. Whenever ethical codes become so stringent that they stifle the profession's efforts to advance in the public esteem, they betray their original intent. An overzealous championing of ethics is often accomplished at the expense of public relations.

Service to Society

The veterinary profession makes a magnanimous contribution to society — but how many people know it? Generally speaking, the public does not know what constitutes a modern veterinarian. As far as many people are concerned, it seems that our only value lies in such things as treating some rich old lady's cat or in treating the vanishing supply of horses. Some feeling exists in high places that the profession has outlived its usefulness. The profession has every right to dispel adverse public opinion. Through ethical promotion many false beliefs and opinions can be eradicated.

Ethical Promotion

The type of action here advocated to promote the profession is positive and dynamic in nature. Actually it is not desirable to refer to such action as "publicity," because the word has such a generalized and often misunderstood meaning. Likewise, "public relations" is inept. For lack of a better description, the proposed course of action shall be called, "ethical promotion." The word "ethical" is inserted in an attempt to avoid the usual implications of the word "promotion." Ethical promotion can be considered a phase of public relations, and as such will serve to properly advertise the profession and place it in its proper perspective in the public eye.

One method of ethical promotion is accomplished through outstanding men who have "made a name for themselves." Some may resent such men and feel that they have been unethical, on the assumption that they have aggrandized themselves in order to stuff their pockets with profit. But then, perhaps, their fame was not the object at all, but merely a consequence? Fame has a peculiar way of attaching itself to those who do not seek it. Is it fair to condemn a fellow veterinarian for being famous, particularly when that fame is a by-product of his industry, ambition, and probably his desire to promote the profession? In these cases ethics can be cited as an excuse; the real basis for resentment may be professional jealously.

But outstanding individuals alone can not promote the profession. A concerted effort should be extended through the auspices of the American Veterinary Medical Association to properly promote veterinary services and merits. This kind of action has been attacked on ethical grounds. But recall, if you will, the

*Student in the Junior Class, Alabama Polytechnic Institute, School of Veterinary Medicine. Editor ('56-'57), *Auburn Veterinarian.*

unfavorable public opinion that has been cast by failure to educate the public. Because of improper informing of the public on the merits of veterinary services, many farmers, for instance, have turned to the inferior health measures of home remedies, "quacks", feed stores, pharmaceutical companies, and other such sources. Any code of ethics which hinders the profession's efforts to gain public confidence is not only a detriment to the profession but also a disservice to the public.

The only way veterinarians can compete — and "compete" is the word, like it or not — with those who transgress the profession's prerogatives is to do one of two things: (1) Lower fees and lower medical standards or (2) maintain fees and standards and convince the farmer and others, by appropriate advertising, of veterinary know-how and worth.

Antivivisection groups, composed of uninformed minorities, have denied their cooperation to the veterinary profession in many areas. Few of them realize that without vivisection in research, progress is impossible. Until members of this group are convinced that veterinarians are not inhumane butchers, antivivisection elements will persist.

What will ethical promotion accomplish? First it will elevate the standing of the profession in the public eye to a position commensurate with the training and skill the profession requires. It will also raise veterinarians above any competitors to the point where it will not be necessary, as is often the case now, to stoop to petty business grabbing. This one point alone could solve many current ethical problems.

Further, the proper promotion of the profession will command the attention of more talented young men, students who have been previously going into other professional fields — human medicine, law, nuclear physics, scientific research, etc. The many new fields which are being opened by technological advances threaten to further drain the veterinary profession of potential talent. If veterinary science is to progress on an equal plane with other sciences, there must be equivalent ability in its new students.

Sound promotion also will impress the public with the veterinarians' usefulness to society, and by so doing will encourage allocation of more public funds for research and educational institutions. A position of prominence in the national economic and social scene will precipitate greater cooperation from the public in disease control programs.

What approach, then, should be used toward ethical promotion? Such a program should have its beginning with the individual practitioner. In his daily dealings with the public the individual veterinarian automatically reflects credit or discredit on himself and ultimately on the profession. The advantages of specific instruction during the professional course relating to proper promotion of the profession is at once apparent.

Opportunities

There are many opportunities for promoting the profession on which we, both individually and collectively, have failed to capitalize. For instance, use of modern media of television both commercial and educational is available. Radio facilities can be used to greater advantage.

Members can write for both scientific and lay publications.

Practitioners can lecture to farmer meetings, community gatherings, men's-club organizations, and the like. Special educational courses can be instituted for farmers, helping them to reduce disease losses.

Colorful and informative demonstrations at agricultural fairs can be displayed by local veterinary associations. The same can be done at scientific exhibitions in museums, zoological gardens, and other appropriate places.

Some members can go into politics, or become otherwise active in government affairs. Practitioners can assume their dutiful role of leadership in their communities.

Many members are blessed with certain talents, unrelated to veterinary medicine, which should not be neglected. Successes outside the profession can be used to publicize veterinary medicine. As an illustration, consider how Doctor Middlecoff's golfing abilities have publicized dentistry.

A program of ethical promotion will require contributions from many individuals within our ranks. Undoubtedly some of these men will gain a personal reputation. It is to the profession's advantage to readjust any critical thinking toward such people, for they are invaluable in public relations. For just as the poliomyelitis foundation used Doctor Salk to sell vaccine, so also must the veterinary profession seek out latent talent and create its own Doctor Salk to sell a similarly beneficial commodity to society — the profession of veterinary medicine.

(Continued on page 590)

Pet Carriers, Inc., Offer New Service To Denver Area Pet Owners

A year ago a group of Denver area veterinarians met to discuss ways and means of ridding themselves of the burden of acting as delivery boys for pet owners. They believe they have solved the problem and they have confidence in the future, despite some discouraging setbacks.

Because the Public Utilities Commission of Colorado opined that a "pet ambulance" did not, necessarily, require a permit and because these veterinarians believed that official sanction and protection would be of benefit to their cause, the name "Pet Carriers" was chosen for the corporation. Under their articles of incorporation their business may entail any and all types of transportation connected with small animal practice — this may include, to a limited extent, the delivery of medicines, the transfer of instruments and equipment from one veterinarian to another, and even the transport of dead animals to an owner, or cemetery or crematorium.

Pet Carriers has been a boon to many boarding kennels of the area, in that it offers a service for their patrons who may have neither the desire nor the time to escort their pet for his regular grooming or to his "baby-sitter" while the family is on vacation. A great many kennels regularly call Pet Carriers to ship their charges at the rail and air terminals. This last use has been quite popular, also, with the railway and airline officials who, heretofor, have had to patiently wait for the dogs and cats to be picked up at the consignee's convenience. Now, they merely call up the Pet Carrier driver who takes the pet directly to his destination, saving the jangled nerves of the terminal employees and the owner the necessity of a trip.

To the busy small animal practitioner, however, this service has proven a God-send. It has provided the ready answer to the bewildered housewife who can not bring her dog for its innoculation because the husband has the car and "Doctor, could you come here and give the shot?" It has relieved considerably the obligation of the veterinarian to rush from his office, leaving a waiting room full of clients, to attend an accident case. In virtually all of these emergencies, the best the veterinarian can do is administer first aid on the spot, load the dog in his own car and haul it to his office. The Pet Carriers driver, an intelligent, young college educated man who drives an ambulance at night for the City

(Continued on page 590)

Promazine in Small Animal Practice

MORTON GRADESS, V.M.D.,
Jenkintown, Pennsylvania

Appropriate and adequate psychotherapy for neurotic and psychoneurotic human patients is often limited by the abnormal behavior pattern of the affected individual and, in many instances, by the financial strain involved. The introduction of chemical compounds that favorably modify mood and behavior has provided a valuable adjunct in the treatment of the mentally ill.

The older hypnotics and sedatives stupefied the patient by depression of the higher cortical centers. However, the newer drugs, particularly those of the phenothiazine series, are believed to exert their action by altering certain metabolic functions of living cells, those of nervous tissue in particular.

Chlorpromazine and the Rauwolfia derivatives have had extensive trial in the psychiatric field but the enthusiasm of early investigators has been tempered by later recognition of the drawbacks inherent in the use of these substances. Although more advantageous than the barbiturates and other hypnotics, many reports on the toxicity of both drugs have appeared in recent medical literature[1,2,3,4].

There have been many references to the use of both Rauwolfia derivatives and chlorpromazine in veterinary literature[5, 6, 7, 8, 9]. While the reports of toxicity do not compare with those in human medicine, the extent and intensity of side effects have been mentioned with disturbing regularity. A recent report on meprobamate (a propanediol derivative)[10] indicates its desirability in canine medicine for the tranquilization of hyperexcitable, nervous and/or unruly dogs by its reduction of anxiety and tension; however, because of its poor solubility in water, it must be given by the oral route.

In human patients, promazine, another member of the phenothiazine series, has demonstrated a quieting influence without marked hypnosis[11, 12, 13, 14]; apparently, alteration of the phenothiazine nucleus allowed avoidance of the pronounced depressive activity and side effects of earlier related compounds. Because its soluble characteristics permit either oral or parenteral administration, promazine hydrochloride (sparine)® was administered to selected patients presented for professional care in small animal practice. The accompanying table is a summary of the pertinent details:

Tabulation of Use of Sparine

No. of Animals	Presented for	Average dose (Sparine)	Results
56	Clipping, grooming & tartar removal	1.5 mg./lb. body wt.	Good, dogs stand quietly & do not fear clippers.
20	Hyperexcitable (boarding, thunderstorm)	1.5 mg./lb. body wt.	Good, animals completely tractable
5	Moist eczema	1.5 mg./lb. body wt.	Good, animals stood for treatment
1	Emesis	1.5 mg./lb. body wt.	Good, cessation of vomiting within 2 hr.
1	Labored breathing from obesity	1.5 mg./lb. body wt.	Good
1	Vicious, worming	1.5 mg./lb. body wt.	Good, permitted treatment
7	Minor surgery—spaying, removal of extraneous objects from mouth, suturing, etc.	1.5 mg./lb. body wt. prior to local anesthesia	Good

Over a two-month period, promazine was administered to patients presented for various reasons who were nervous, timid, excitable, or vicious. The drug was administered orally or intramuscularly in doses from 1 to 2 mg./lb. of body weight; an optimal general dosage seemed to be about 1.5 mg./lb. Results were strikingly satisfactory; the animals were calmed, anxiety and unruliness were reduced without evidence of sedation or hypnosis and the effect persisted for four to six hours. In a few selected cases, promazine and local anesthesia were substituted for a general anesthetic with gratifying response. Use of the drug contributed to tranquilization and easier handling of hyperexcitable animals with obvious advantages to the patient, the owner, and the veterinarian.

®Wyeth Laboratories, Phila., Pa.

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Clinical Pathology

Report of Committee on Clinical Pathology, American Animal Hospital Association, 23rd annual meeting, Miami, Fla., May 23-26, 1956.

This Committee is one of several Special Committees of the A.A.H.A. appointed by the president for consideration of problems of current interest within the particular premise suggested by title. Previous reports in 1952 and 1953 concerned extent laboratory procedures were being employed and the facilities that were provided for such service and the personnel charged with duties. The Committee for 1956 considered it desirable to determine fees charged for laboratory diagnostic procedures and to what extent laboratory assistance was employed for differentiation and definitive diagnosis of canine distemper (virus of Carré) and infectious canine hepatitis.

Questionnaires were provided all active members, 122 of which gave detailed replies. These were considered to reflect rather accurately the range and average of charges made for the listed technics relating to blood examination and urinalysis.

Almost all of this laboratory work was performed by the veterinarian or his associates. A total of 22 members stated that at least a portion of this work was performed by technicians at human hospitals or commercial laboratories.

Methods employed to keep records of laboratory work on patients also interested the Committee and questions answered revealed that 92% made such report a portion of the patient's permanent file. Only 31 of those answering used individual laboratory card especially prepared for the purpose.

That part of the questionnaire relating to the use of laboratory porcedures to confirm diagnosis of distemper and hepatitis revealed that only a few considered examination of mucosal scrapings for inclusion bodies of distemper and liver impression smears for diagnostic bodies of infectious hepatitis practical. Other laboratory aids employed by a larger number included a series of regularly applied blood tests. Mentioned of these were W.B.C., differential white count, sedimentation rate, packed cell volume, blood urea nitrogen, and hemoglobin percentage. Fecal examination for bile content and urine for bilirubin were also listed by one member hospital reporting.

Of interest was the differential diagnostic table supplied by one hospital:

(Continued on page 590)

Charges made for Laboratory Procedures

	Fee charged ($)												
Exam.	0.50	1.	1.50	2.	2.50	3.	3.50	4.	4.50	5.	6.	7.50	10.
Blood:													
W.B.C.	....	15	7	18	3	8	1	1	....	2	....	....	....
R.B.C.	....	17	7	18	4	11	1	1	....	1	....	....	....
Hemo	2	24	3	6	2	....	....	....	....	1	....	....	....
Sedimentation rate	....	14	3	12	2	2	2	1	....	1	....	....	....
Packed cell volume	....	15	3	9	....	....	2	....	....	....	....	....	....
Differential count	....	8	4	13	....	14	4	5	....	4	....	....	....
Blood sugar	....	4	1	4	2	17	1	1	....	21	1	....	....
Blood urea	....	1	1	7	4	29	1	2	....	24	1	....	....
Complete blood count	....	....	....	....	....	9	1	8	1	70	5	2	4
Urinalysis	....	12	9	31	5	27	7	2	....	1	....	....	....

Plum Island Laboratory a Reality

Over a century ago, in 1843, the captain of a British freighter sold a New Yorker named Peter Dunn what was perhaps the most expensive cow in history. The price was right, but Peter Dunn had no way of knowing that one milk cow was to introduce contagious pleuropneumonia into the United States, costing livestock owners countless thousands of dollars.

USDA photo.

Animals are being driven out of an air-lock room in which they were sprayed with insecticide. They will pass through a second air-lock room before reaching assigned quarters. The second air-lock room, like the first, prevents air release of contaminated air or material to outer areas.

The ever-present threat of invasion by foreign livestock diseases has not diminished, but it was met head on when Congress appropriated $10,000,000. for a research laboratory at Plum Island, N. Y. Completion of the project was signalled during the week of Sept. 24-28, 1956 when the new research unit was opened for public inspection. Secretary of Agriculture Ezra Taft Benson was the first of an impressive roster of speakers which included Dr. B. T. Simms, director of livestock research for the Agricultural Research Service; Dr. William A. Hagan, dean of the New York State College of Veterinary Medicine, Cornell University; and Mr. Albert K. Mitchell, livestock producer of Albert, N. Mex., and chairman of the Secretary's foot-and-mouth disease advisory committees. After a week of public inspection the Plum Island Animal Disease Laboratory settled down to operate with the security of an atomic plant. Its findings could conceivably have a more far-reaching effect on world relations than the discovery of nuclear fission.

As provided by Congress in authorizing research on the most formidable foreign animal diseases—principally foot-and-mouth disease—that are potential threat to the United States livestock industry, the laboratory is located on an off-shore island near the northeast tip of Long Island, N. Y. Both island isolation and laboratory precautions make this testing ground the safest in the world.

USDA scientists are seeking an effective foot-and-mouth vaccine, a better and faster method of diagnosis, and increased knowledge of the behavior and pattern of this disease that has threatened the nation's livestock industry several times in recent years.

Not alone has the United States been invaded by foot-and-mouth disease with ruinous losses, reminds Dr. M. S. Shahan, director of the laboratory, but we "are surrounded by other grave diseases including rinderpest, African swine fever, and Rift Valley fever. We must be on the defense."

Only healthy animals are used for research work. With a series of air-lock rooms, contamination through entrance and egress is made impossible. Maximum precautions are also exercised in preventing laboratory workers from carrying diseases either off the island, or from one section of the laboratory to another. In passing from one animal isolation section to another, laboratory workers must change garb and take soap showers.

USDA photo.

Laboratory technicians at USDA's Plum Island Animal Disease Laboratory handle infectious virus materials in special safety hoods. These are equipped with attached rubber gloves. This device confines any virus material that might be spilled or dropped and helps to prevent contamination of the laboratory room.

Examining cultures of foot-and-mouth disease virus with a microscope. Technician (right) is preparing a nutrient solution in which animal tissue, infected with foot-and-mouth disease, will be suspended to keep the tissue alive and the virus multiplying. Production of virus in this manner assures laboratory scientists of an adequate supply for research studies.

USDA photo.

The principal building of the new USDA laboratory is one of the most modernly equipped animal disease research laboratories in the world. Vent pipes carry air out of the building after it has been thoroughly cleaned and filtered to remove any possible contamination. An incinerator plant burns all carcasses of animals used experimentally in laboratory work, as well as solid wastes. Sewage and liquid wastes are sterilized before being released outside the plant. Incoming air is filtered, and feeds imported for experimental work are processed to kill rodents and insects.

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Clinical Pathology

(Continued from page 588)

Laboratory Procedure	Infectious Hepatitis	Canine Distemper
W.B.C.	leucopenia (usually)	leucopenia (slight) usually leukocytosis
sedimentation rate	increased (usually)	normal
urine	color amber	normal color
	bilirubin usually present	bilbirubin usually absent
	yellow stained casts	.....
	bile stained	normal
Blood urea	slight elevation (occasionally)	normal

The Committee made no general comment regarding its findings. The returns however, suggested the essential need for furthering investigation of clinical laboratory procedures as practical diagnostic aids. It is anticipated that this Special Committee will be requested to continue its efforts to determine the consensus of members and to encourage extension in development and use of hospital laboratory facilities.

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Pet Carriers, Inc.

(Continued from page 586)

Hospital, is trained to give first aid to the suffering animals. He can, with far better equipment than the ordinary practitioner's car may hold, transport the pet more comfortably and quickly than ever before.

The corporation is headed by a Board of Directors of five small animal practitioners of the Denver area. The charges for the service has been set up and are regulated by the Colorado Public Utilities Commission. These are: Emergency pickup, $5.; pickup with reasonable notice $3.; round trip, $5.—*G. H. Gilbert, D.V.M., Arvada, Colo.*

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Selling the Veterinary Profession

(Continued from page 585)

Veterinary medicine has made tremendous strides in the past half century. It is unfortunate, but nonetheless true, that public opinion has not kept pace with the profession's progress. Veterinarians have only recently outgrown the "horse doctor" stage in the public spotlight. Hopefully it will not take another 50 years to inform the public that veterinarians are men of science.

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Authorized by the 84th Congress, the U. S. Public Health Service has started its three-year $90,000,000. aid program for the construction of medical research facilities.

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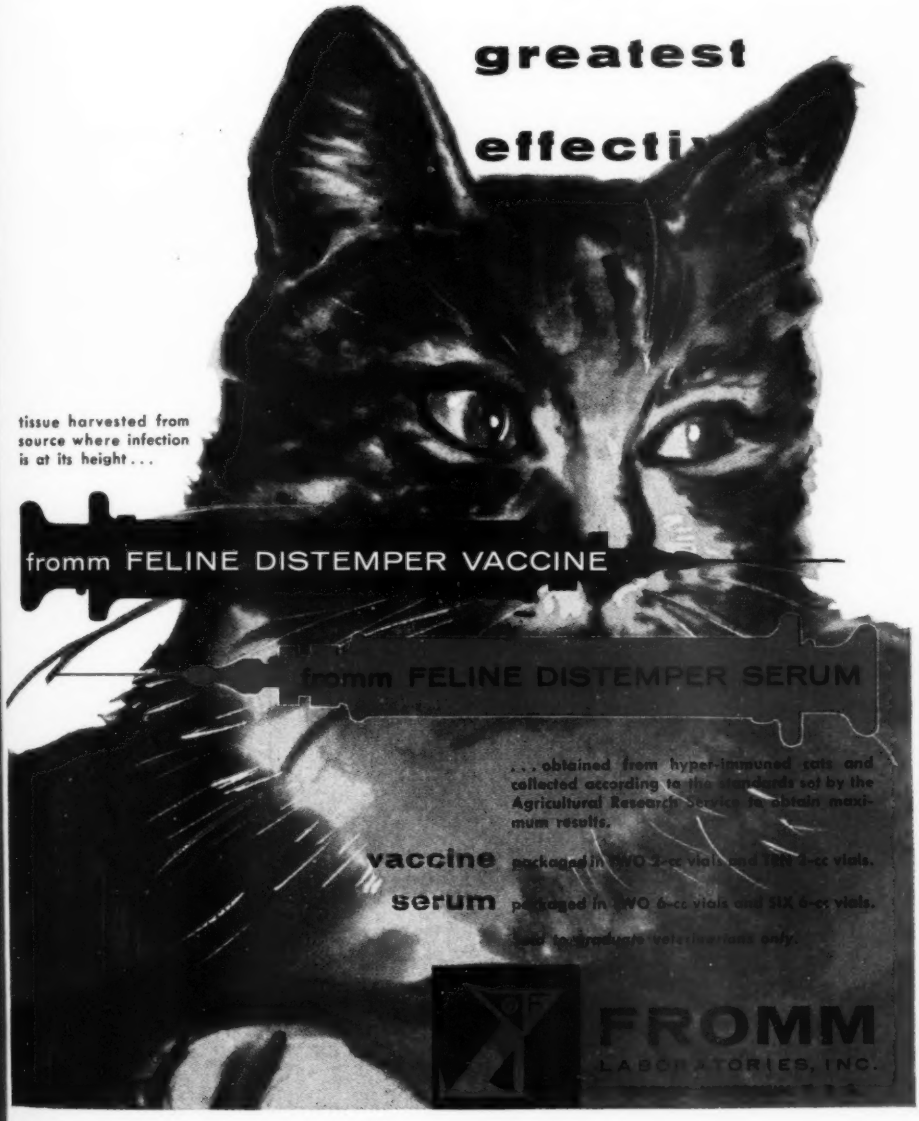
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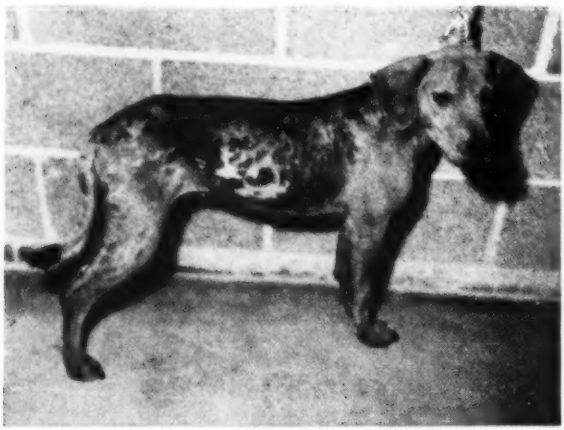

BEFORE SELEEN—Hound had suffered from demodectic mange almost from birth. In spite of therapy with almost every type of skin medicament, condition grew steadily worse. Photo taken four days before first SELEEN treatment.

AFTER SELEEN—Marked improvement shows in elimination of mange mites and lesions, clearing of affected areas, regrowth of haircoat. Photo taken 19 days and three SELEEN treatments after first picture.

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ANNUAL AWARDS

Seven men were honored during the opening session of the San Antonio meeting. By these means a grateful veterinary profession honors those who have given outstanding service in special field of endeavor.

Borden Award

A cash honorarium of $1,000., with accompanying gold medal representing the national Borden Award for outstanding research which contributes to dairy cattle disease control was presented Dr. Herbert L. Gilman, professor of Veterinary Bacteriology at the New York State Veterinary College at Cornell University, Ithaca, N. Y.

Dr. Herbert L. Gilman

Citation pointed out extensive studies on reproductive diseases and sterility in dairy calves and research on bovine brucellosis, trichomoniasis, and vibriosis to which Doctor Tilman has devoted most of his professional life.

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A.V.M.A. Award

Col. Robert J. Foster, USA, VC (retired) of San Francisco, Calif. was presented the A.V.M.A. Award for distinguished service to the veterinary profession.

Colonel Foster was the eighth veterinarian to receive the coveted recognition since its establishment in 1931. This award is bestowed only when the Association feels that a member is deserving of unusual recognition for his general service to veterinary medicine.

In presenting the award, President Floyd Cross cited Colonel Foster's "50 years of tireless effort to uphold the standards of veterinary medicine and the profession in all walks of life — civil, military, and governmental."

Col. Robert J. Foster

Colonel Foster began his career in the U. S. Army in 1905. When the Army Veterinary Corps was created in 1917, he was one of the few veterinarians having previous military experience. He was chief of the Corps from 1934 to 1938.

During his service as president of the A.V.M.A. in 1936-37 he furnished effective leadership in reorganization of the Association.

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XII International Veterinary Congress Prize

Dr. Hadleigh Marsh, Helena, Mont. was presented the XII International Veterinary Congress Prize, including a cash award of

Dr. Hadleigh Marsh

$125., in recognition of his many contributions to knowledge of animal diseases, especially of sheep, and their control.

Doctor Marsh is presently Montana State Veterinarian, on leave of absence from the Montana Veterinary Research Laboratory. His record as a sanitary official was also mentioned in the citation.

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Special Awards

Mr. Charles I. Travers, secretary of the California Veterinary Medical Association, San Francisco and Mr. Harry Miller, director of the Gaines Dog Research Center, New York City, were presented special Certificates of Appreciation.

These give evidence to selected persons who have made significant contributions to the public understanding of the veterinary profession.

Mr. Travers has served the California Association for ten years, during which time its membership has increased more than four times. Commended were his untiring energy and readiness to be of service.

Mr. Miller was cited for his interest in and devotion to dogs and for his activities in presenting to the public the part which veterinary science and veterinarians play in safeguarding dog health.

Dr. Wayne H. Riser

Dr. Wayne H. Riser, ISC '32, practitioner, Skokie, Ill., was awarded the first A.V.M.A. Research Council Award for research by a practitioner. Doctor Riser was commended for the contributions from his research efforts as a practitioner "beyond the call of duty," and for his interest in the welfare of man's animal friends. He is much in demand as lecturer at veterinary and other organizations. He is author or coauthor of approximately 35 research and professional papers and publications. At present Doctor Riser is executive secretary of the American Animal Hospital Association, editor Small Animal Medicine for the *Journal of the A.V.M.A.*, in addition to many board memberships and offices in professional and scientific societies.

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Humane Act Award

A 15-year-old Eagle Scout, Glen T. Allen of Miami, Florida, was named winner of the 1956 Humane Act Award.

Eagle Scout Glen T. Allen

Glen, son of Mr. and Mrs. William Allen, will receive a $100. Savings Bond in addition to the official national citation. He was selected for the honor because of his 4½ year fight for permanent protection and government refuge for the tiny, rare, Florida Key deer.

He took his crusade to save the Key deer right to the top by writing letters to Presidents Truman and Eisenhower and other leaders in government and conservation circles. The es-

tablishment of the National Key Deer Refuge in 1954 was a start toward guaranteeing the natural habitat for the perpetuation of this unique wild creature.

These animals are found only in the Florida Keys, the only area in the world where they can survive. They are the last of their species in the world, with the present herd numbering slightly over 100, compared with only 30 in 1951.

"Glen is one of the most deserving youngsters ever to receive this award," commented Dr. W. A. Young, chairman of the National Humane Act Award Committee.

Eleven additional certificates in recognition of outstanding acts of kindness toward animals were also presented by the association to a group of boys and girls whose acts of kindness toward animals merited the action by the National Committee.

▾ ▾ ▾

Warns of Anthelmintic Toxicity

Dr. R. D. Turk, head of the Department of Veterinary Parasitology, Texas A. and M. College, sounded a warning against indiscriminate use of anthelmintics. Regardless of the excellence of many of these agents, none can repair damage already done on infected animals.

Control of parasitism in farm animals, stated Doctor Turk, does not consist merely of administering a drug known to be toxic to specific parasites. Improved management practices and adequate nutrition are necessary regardless of experimentally proved efficacy of drugs. He pointed out that personal hygiene was primarily responsible for low incidence of human parasitism. The clinician was urged to be ever mindful that animals exhibiting clinical evidence of parasitism are ill and that anthelmintics may prove toxic in these animals whereas they cause no apparent ill effects in normal individuals.

Though many good agents have been made available, a perfect treatment, one that kills or expels all intestinal parasitic forms, has yet to be developed. All are designed to be toxic to parasites and have some varying potential toward toxicity for hosts, and therefore, must be used and dispensed critically.

▾ ▾ ▾

Tranquilizers under Restricted Sale

In order to prevent possible diversion to human use of tranquilizing drugs intended for administration to animals, the Food and Drug Administration has advised that these new veterinary products will be restricted to professional use.

New-drug applications for veterinary tranquilizers specify that labels will bear the warning: "Caution: Federal law restricts this drug to sale by or on the order of a licensed veterinarian."

It was pointed out that present medical knowledge of the tranquilizers requires that use for human being be under medical supervision.

▾ ▾ ▾

Colonel Hale Retires after 30 Years Active Military Service

Col. Maurice W. Hale, UP '28, was awarded a Certificate of Achievement for outstanding service as director of the Division of Veterinary Medicine at the Walter Reed Army Institute of Research, Washington, D. C. Maj. Gen. Leonard D. Heaton (left), Commanding General of Walter Reed Army Medical Center, presents citation to Colonel Hale, who has accepted a position as head of the Animal Disease Department at the Georgia Coastal Plains Experiment Station, Tifton, Ga.

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ANY DOG BOOK: General titles by Will Judy—Principles of Dog Breeding $4. Ken'l Bldg. & Plans $3. Training the Dog $3. Dog Scrapbook $3. Dog Care & Keeping $2. Judy Publ'g Co., (Dog World), 3323 Michigan Blvd., Chicago 16.

OPPORTUNITY: Nationally established ethical Manufacturer-distributor of veterinary pharmaceuticals offers immediate opportunity, for man qualified and/or experienced, in the production of veterinary pharmaceuticals. Address Box 340, care VETERINARY MEDICINE.

WANTED: Sales representatives wanted (4) to call on veterinarians only in Illinois, Indiana, Wisconsin and the Chicago metropolitan area; to represent and detail established line of biologics and pharmaceuticals. The company is one of the leading, established ethical producers. Our employees know of this ad. Please state experience, salary expected in first letter. Address Box 341, care VETERINARY MEDICINE.

WANTED: January, March, May and July, 1956 issues of VETERINARY MEDICINE. Your subscription will be advanced one month for each copy. Mail to VETERINARY MEDICINE, Suite 803 Livestock Exchange Bldg., Kansas City 2, Missouri.

FOR SALE: Well equipped animal hospital in Illinois. Practice includes large and small animals; established 10 years; still growing. Apartment adjoining. Address Box 342, care VETERINARY MEDICINE.

FOR SALE: Two good used two way radio mobile units ready to go complete and in excellent condition. One can easily be modified for a base station for about $100.00 and includes base tower. Price $800.00. Dr. E. C. Lunn, Malta, Illinois.

Every dairyman should use a strip cup at every milking of every cow.—*Hoard's Dairyman*, Oct. 10, 1956.

Alabama Veterinarian Joins Eaton Staff

Dr. Thomas V. Raines, Jr. has joined the Veterinary Department of Eaton Laboratories, a division of The Norwich Pharmacal Co.,

Dr. Thomas V. Raines

Norwich, N. Y. Doctor Raines has been associated with the Diagnostician Laboratory, Madison, Wisc.

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- **Minerals and Vitamins**

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VETERINARY CHUTE
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Dairy Herd Problem Diseases

A nationwide survey conducted under the auspices of the American Dairy Science Association revealed that mastitis was the outstanding disease problem not under satisfactory control. Vibriosis, ketosis, leptospirosis, foot rot, anaplasmosis, coccidiosis, internal parasite, and cystic ovaries were mentioned most frequently as other major problems.—*Timely Topics.*

▼ ▼ ▼

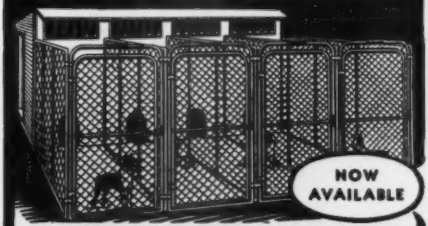
A new live-virus poliomyelitis vaccine, consisting of pure, highly attenuated strains of three virus types and administered orally, is now ready for large scale tests on human subjects, according to Dr. Albert B. Sabin of the University of Cincinnati School of Medicine.

Culture fluids, administered orally in a teaspoonful of cherry syrup to 53 human volunteers, produced an immunizing, symptomless infection, according to report in *Medical News* for October 22, 1956.

▼ ▼ ▼

Psittacosis among poultry processing workers has been reported recently from Virginia and Texas.

MASON'S *New* KENNEL RUNS



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For SMALL ANIMAL HOSPITALS

Quickly Erected - NO POSTS REQUIRED

Can be set on concrete or wood floors or directly upon the ground, joining to, or independent of Building. Composed of strong, self-supporting Fence sections and Gate Units with GATES BUILT-IN and Lockable Latches.

FREE CATALOG

Send for Free Catalog with Low Direct Factory Prices of Kennel Fences of all kinds, Kennel Doors, Cages and Hospital Equipment.

THE MASON FENCE CO., Box 77, LEESBURG, OHIO

Dr. S. Edward Sulken, the University of Texas Southwestern Medical School, Dallas, has reported a fatal case of human rabies, the fourth in the area during the current year (*Morb. & Mort. Weekly Rept.*, Oct. 26, 1956). Incubation period in this latest case was 54 days.

Produced for exclusive use of the Graduate, Licensed Veterinarian

MEMBER: Associated Veterinary Laboratories, Inc.

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The rigid standards embodied in Grain Belt products have been applied to a new line . . . Affiliated. These products, too, are of that high quality you have come to expect from Grain Belt. Our reputation, gained through 35 years of continuous service, is fully behind the entire Affiliated line. We invite you to use these products in full confidence. ● The Grain Belt Supply Company, which has served you faithfully for many years, is proud to take part in bringing you the new Affiliated line.

GRAIN BELT SUPPLY COMPANY, 4902 South 33rd Street, OMAHA, NEBRASKA

now you can prevent relapses in milk fever . . . PARTEROL*

WHAT IS PARTEROL?

Parterol is an oil-soluble steroid obtained by irradiating ergosterol.

WHAT WILL IT DO?

Parterol has specific action on blood calcium. Intramuscular or oral doses produce a rise of calcium in the blood and tissue.

HOW DOES IT RAISE THE BLOOD CALCIUM LEVEL?

By supplementing the hormone secreted by the parathyroid glands. This calcium-raising action of Parterol is produced by mobilizing calcium stored in the bones and increasing the absorption of calcium from the intestinal tract.

INDICATION AND DOSAGE:

To prevent relapses in milk fever by supplementing the parathyroid hormone during periods of stress on the calcium-regulating mechanisms due to increased demand for calcium at parturition. After treatment with calcium, Parterol should be given at the rate of 10 mg. per cow.

To prevent milk fever by regulating the calcium blood and tissue level at the critical calcium-utilization period at parturition. Parterol should be given 24 hours prior to parturition in a dosage of 10 mg.

PACKAGING:

Parterol is supplied in 30-cc. sterile vials. Each cc. contains 2.5 mg. Dihydrotachysterol in oil.

For further information write

S. E. MASSENGILL COMPANY

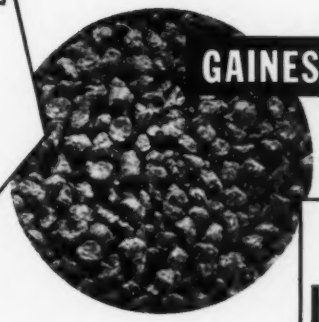
Veterinary Division

Veterinary Division

Bristol, Tennessee

*Patent Applied for

the big difference here...



makes a big difference here...

Yes, Gaines makes the difference

because the special Gaines homogenizing process combines ingredients of the Gaines formula into appetizing granules—each granule containing uniform amounts of every food element dogs are known to need.

Gaines program of quality control, testing and research is an exacting and never-ending one. It results in what we honestly believe is the highest standard possible in the production of dog food. Gaines Homogenized Meal is far more assimilable, more palatable and much easier to feed . . . good reasons why Gaines is America's largest-selling dog meal.

Gaines indeed makes the difference . . . you can use Gaines with confidence . . . recommend Gaines with confidence . . . because complete and uniform nourishment is guaranteed.

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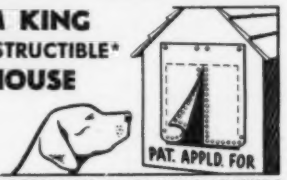
Gaines ***HOMOGENIZED*** **DOG MEAL**

STORM KING
NON-DESTRUCTIBLE*
DOG HOUSE
FLAP



*CANNOT BE DESTROYED BY PLAYFUL CHEWING
Pliable, re-inforced all weather rubber, aluminum riveted along the inner and lower edge.

CANNOT BE BLOWN IN BY WIND
Keeps kennel box cleaner, warm and dry, by allowing dog to go in and out at will.

11"x13"..$3.75 15"x16"..$4.00 16"x20"..$4.50

Postage paid, send check or money order.

SPORTSFAIR MFG. CO.
Box 134, Battle Creek 7, Michigan

A new water-soluble form of furacin (nitrofurazone — Eaton) placed in drinking water to a concentration of 0.008% has been shown to protect young birds experimentally inoculated with sporulated oocysts of *Eimeria tenella*, organism responsible for cecal coccidiosis. The new product is known as Furacin Water-Mix Veterinary.

▼ ▼ ▼

Millions of dollars and thousands of animals and birds are sacrificed annually in the search for more efficient way to feed and manage livestock.

Effects of Debeaking Chicken

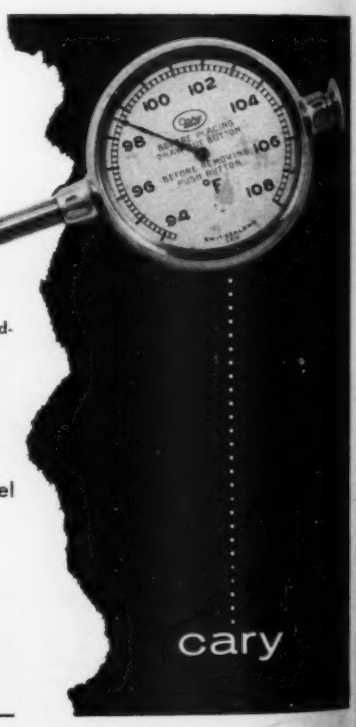
In the *Australian Veterinary Journal* of May 1956, McDonald reports on The Effect of Debeaking (to control cannibalism) on the Performance of the Chicken. In general the results are that "moderate debeaking" (1/3 to 1/2 of the upper beak at from one day to three weeks of age) did not seriously affect capacity to grow, and the slight "depression" is overcome before market age is reached. From field test, it was concluded that if more than one-half of the upper beak is removed marked growth depression occurs, mortality is quite high (55% by six weeks of age). The opinion is advanced that a possible cause of death is clogging of the nostrils with mash. The project does not report on the effect or lack of effect on later ability to indulge in cannibalism.

▼ ▼ ▼

The current issue of Farm Journal names Pebble Beach Prince, Holstein bull owned by the New York Artificial Breeder's Cooperative, as "daddy of 'em all." He has sired 100,000 calves.

New Clinical Thermometer

with remarkable un-varying accuracy
to within .1° F (one tenth degree F.)
—as regularly verified by the
Bureau of Standards.



- All metal construction
- Rapid response
- Push button indicator lock and release
- Unaffected by sterilizing chemicals
- Safe
- Two models

Actual size of standard model.

Virtually indestructable, the amazing new Cary Clinical Thermometer has all the important features long sought after by members of the medical profession.

Standard Model only **$10.00**

Long Stem (3-11/16") Model only **$12.50**

Price includes neat plastic pocket case

Please include money order or check with order.
UNCONDITIONALLY GUARANTEED FOR 5 YEARS

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INCREASED POTENCY

MASTITIS FORMULAE FOR THERAPY AND PROPHYLAXIS

AT REDUCED PRICES!

✳ WITH PAPAIN ADDED

dissolves clots · improves drainage · for freer access of antibiotics to infected areas

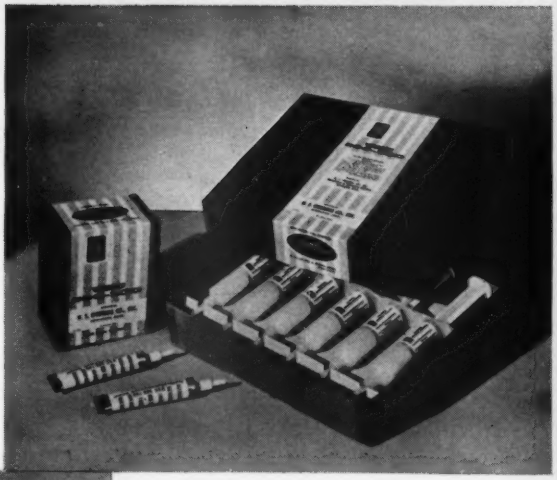
USC 500-100

with PAPAIN

A PROPHYLACTIC MASTITIS FORMULA
POWERFUL ENOUGH FOR THERAPEUTIC USE

Each 11cc liquid base tube or syringe contains:
500,000 U. Cryst. Penicillin Potassium G
100 mg. Dihydrostreptomycin (as sulfate)
500 mg. Sulfamerazine, Microcrystalline
500 mg. Sulfathiazole, Microcrystalline
7.5 mg. Cobalt Sulfate
50 mg. PAPAIN

11cc TUBES	$ 3.90 per doz.	32.5¢ per tube
in 1-gross lots	41.76 per gross	29¢ per tube
in 3-gross lots	38.16 per gross	26.5¢ per tube
in 5-gross lots	36.00 per gross	25¢ per tube
11cc SYRINGES	$ 5.40 per doz.	45¢ per syringe
in 1-gross lots	57.60 per gross	40¢ per syringe
in 3-gross lots	54.72 per gross	38¢ per syringe
in 5-gross lots	52.56 per gross	36.5¢ per syringe



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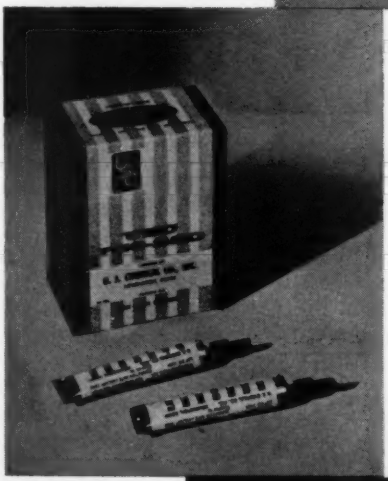
U.S. Chemical's mastitis preparations are now colorfully packaged in new, sturdy, modern-designed boxes of twelve. Each formula is packaged in an individual color, to provide absolute control in dispensing and administering; imprinted with Doctor's name on orders of one gross or more.



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with PAPAIN

A POWERFUL THERAPEUTIC FORMULA AT AN UNMATCHED ECONOMY PRICE

Each 11cc liquid base tube contains:
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250 mg. Dihydrostreptomycin (as sulfate)
500 mg. Sulfamerazine, Microcrystalline
500 mg. Sulfathiazole, Microcrystalline
7.5 mg. Cobalt Sulfate
50 mg. PAPAIN

11cc TUBES	$ 4.92 per doz.	41¢ per tube
in 1-gross lots	51.84 per gross	36¢ per tube
in 3-gross lots	47.52 per gross	33¢ per tube
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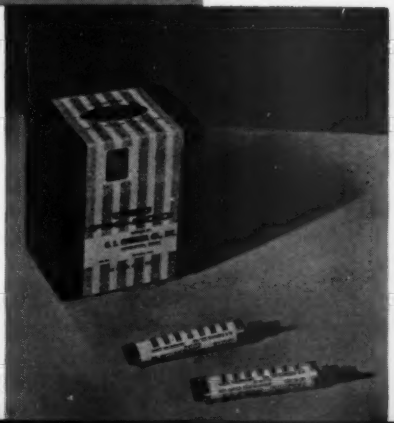
EFFECTIVE THERAPY FOR STUBBORN DRY QUARTERS IN MASSIVE 28cc DOSES

Each 28cc liquid base tube contains:
750,000 U. Cryst. Penicillin Potassium G
500 mg. Dihydrostreptomycin (as sulfate)
750 mg. Sulfamerazine, Microcrystalline
750 mg. Sulfathiazole, Microcrystalline
7.5 mg. Cobalt Sulfate
50 mg. PAPAIN

28cc TUBES	$ 5.94 per doz.	49.5¢ per tube
in 1-gross lots	64.80 per gross	45¢ per tube
in 3-gross lots	59.04 per gross	41¢ per tube
in 5-gross lots	56.16 per gross	39¢ per tube



USC's famous base allows a faster release of antibiotics from the base to the infected areas—thus allowing a maximum amount of therapy in a minimum amount of time.

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HALIMIDE is . . .
RAPIDLY BACTERICIDAL
NON-SELECTIVE
TUBERCULOCIDAL WHEN DILUTED WITH ALCOHOL

- **NON-CORROSIVE**
  NO ANTI-RUST TABLETS TO ADD
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  NEED NOT BE CHANGED FREQUENTLY
- ***INEXPENSIVE***
  1 ounce makes 1 gal. of solution

LIST PRICE—4 oz. bottle..... $2.50
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HALIMIDE and your INSTRUMENTS
. . . THEY COMPLIMENT EACH OTHER

Now Haver-Lockhart

Dr. Joseph F. Knappenberger, president of Ashe Lockhart, Inc., has announced the merger of his company with Haver-Glover Laboratories, effective November 1, 1956.

Dr. Joseph F. Knappenberger

The newly formed company, to be known as Haver-Lockhart Laboratories, will maintain its headquarters offices and two manufacturing plants in Kansas City, Missouri.

Doctor Knappenberger said that Haver-Lockhart will continue to adhere to the policy of sales to graduate veterinarians only, which has been observed by both firms in the past.

Ashe Lockhart, producers of biologicals for large and small animals, was founded in 1927 by the late Dr. Ashe Lockhart. Haver-Glover has supplied a wide variety of pharmaceutical products and instruments to the profession for 36 years. Doctor Knappenberger will continue to serve as president of the combined companies.

Mr. Clif V. Haver, who relinquished active control of his pharmaceutical company earlier this year, will remain as a member of the board of directors.

Veterinarians who serve as key personnel on the Haver-Lockhart staff are Dr. Glen L. Dunlap, vice president in charge of biological research and production; Dr. Franklin W. Binkley, veterinary bacteriologist; Dr. Busch Meredith, assistant laboratory director; Dr. Frank A. O'Donnell, veterinary clinician; Dr. Jake D. Fortenberry, sales manager; and Dr. James Gough, professional services representative. Rudolph Seiden, D. Sc., is vice president in charge of pharmaceutical research and production.

First, he figures average dose. He administers about half of it in 20 to 30 seconds. Gives this time to show its full depressant effect. Then, fractional doses—with intermittent pauses—until he reaches

...*smooth, controlled anesthesia with* NEMBUTAL®

When you administer NEMBUTAL, onset of action is prompt, duration and degree of anesthesia are easily controlled. Anesthesia is produced in three to five minutes, lasts 60 to 90 minutes. One-dose administration means no interruptions during operation, no obstructing equipment.

Muscle relaxation accompanying NEMBUTAL anesthesia speeds your operative procedure. Recovery is safe, with virtually no side effects. And animals remain quiet several hours after operation.

Used safely and successfully in veterinary medicine for more than 23 years, NEMBUTAL Sodium Sterile Solution is available in 100-cc. multiple-dose bottles. Abbott

•NEMBUTAL/Pentobarbital Sodium, Abbott

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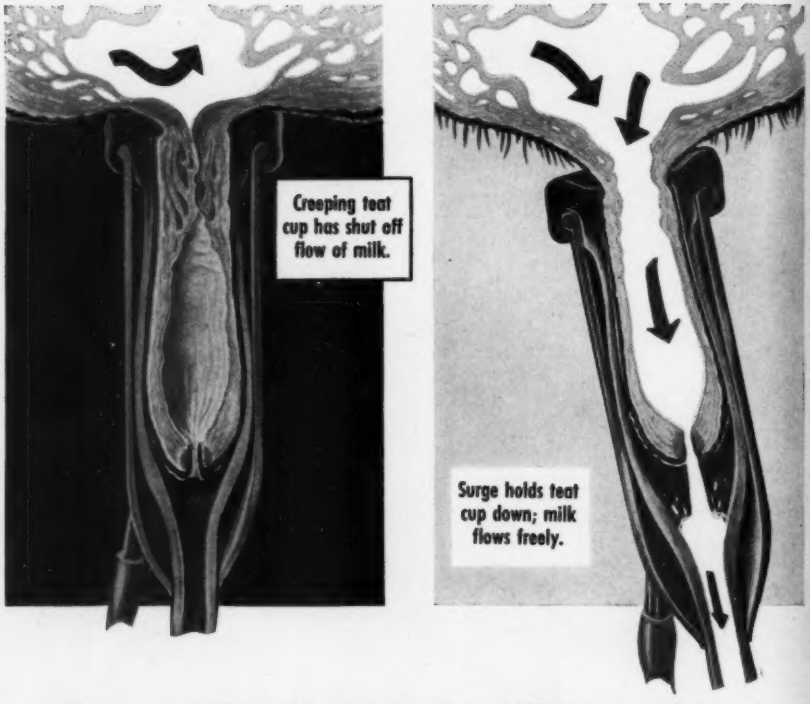

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Pipe Line Milking is still cow milking. Creeping teat cups that pinch milk flow are still creeping teat cups, even though they are on an installation costing several thousand dollars.

Surge Teat Cups Don't Creep. Genuine Surge TUG & PULL milking automatically holds teat cups down where they belong.

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Will bring these benefits to your practice

1 Longer, more effective therapeutic action. Norcalciphos provides calcium, phosphorus and magnesium in metal-organic form for decreased ionization rate and longer therapeutic action, in contrast to rapidly eliminated, irritating inorganic compounds.

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4 Less irritation. Magnesium is available as magnesium gluconate — less irritating and more slowly ionized than magnesium chloride.

Doz. 500 cc $9.50; 3 Doz. @ $9.22; 6 Doz. @ $9.03; 12 Doz. @ $8.55

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Quick relief for Bone, Bursal or Tendon Lameness

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DAIRMOL DUSTING POWDER FOR GRANULAR VAGINITIS

Antiseptic **Astringent**

"THE DAIRMOL WAY"

Compounded under the direction of veterinarians of exceptional experience. Highly recommended by leading herdsmen as the best treatment for the purpose.

Also mfrs. of LIQUID Dairmol Antiseptic and Deodorant.

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Mr. James A. Woodburn has been recently elected vice-president and general sales manager of the Silent Glow Burner Corporation, Hartford, Conn., producers of crematory destructors. He will assume administrative responsibility for all sales and advertising of all Silent Glow products.

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The optimum particle size of phenothiazine has not been determined and opinions appear to differ as to the influence of size of particles in suspension to anthelmintic efficacy.

Calciphos - *organic calcium - phosphorus compound*

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From the Heart of Corn

Easily Assimilable Calcium

Protects against depletion of Mineral Reserves - Pregnancy - Lactation - Weaning - Anorexia

Helps Correct Mineral Deficiencies - Rickets - Skin Diseases - Nervous Disorders - Slow Union of Fractures

Daily Dose of Calciphos: For small animals 2 to 4 tablets, or 1 or 2 teaspoonfuls powder, mixed with food.

Calciphos: 10-grain tablets in bottles of 100 and 500. Powder in bottles of 5 oz.

WRITE FOR LITERATURE AND SAMPLE

Calciphos, Reg. U. S. Pat. Off., E. Bilhuber, Inc., Mfr.

BILHUBER-KNOLL CORP. ORANGE, NEW JERSEY

NO. 3 OF A SERIES:

Controlling the worms in cattle with new Pheno-Fortified Salt

Q. Do some modern management practices tend to intensify the worm problem?

A. Yes, pasture irrigation, for one. In addition to providing more feed, it also provides optimum conditions for parasite growth—even temperature and moisture at the base of plants, where parasites thrive. And the fact that irrigated pastures carry more animals, and are often used for susceptible young stock, makes them an even more important consideration in the new approach to worm control.

Q. Why has 2-way worm control with phenothiazine proved most practical?

A. Because it controls both the immediate worm problem and that of reinfection. Here's how it works: After veterinary diagnosis, phenothiazine, as a worming dose, is used to knock out adult worms. Then "pheno," in a suitable carrier, is fed daily in small amounts . . . to suppress production of viable eggs that contaminate pastures. This assures the continuing protection needed by young dairy animals, beef stock, feeder steers and sheep. Programs like this are now recommended by 17 states, as well as by other groups who have recognized the growing seriousness of today's worm problem. Note: phenothiazine is the parasiticide that kills a wider range of parasites than any other drug of its kind in the veterinary field.

Q. Why is phenothiazine in salt especially effective for low-level feeding?

A. Because salt, an ideal carrier for "pheno," is needed every day of the year by livestock; and because salt fits any feeding program. One of the best commercial products for this type program is Sterling Green'salt —produced by the International Salt Company. Fed free choice or as the salt in feed (at the rate of 1%), Green'salt has proved ideal for low-level control. It contains salt, 10% "pheno," and the six essential trace minerals: iodine, cobalt, iron, copper, manganese and zinc—as well. Daily intake of Green'salt per head should be about two tablespoons for adult cattle, one-half tablespoon for sheep. This feeding should be continuous, following the worming dose.

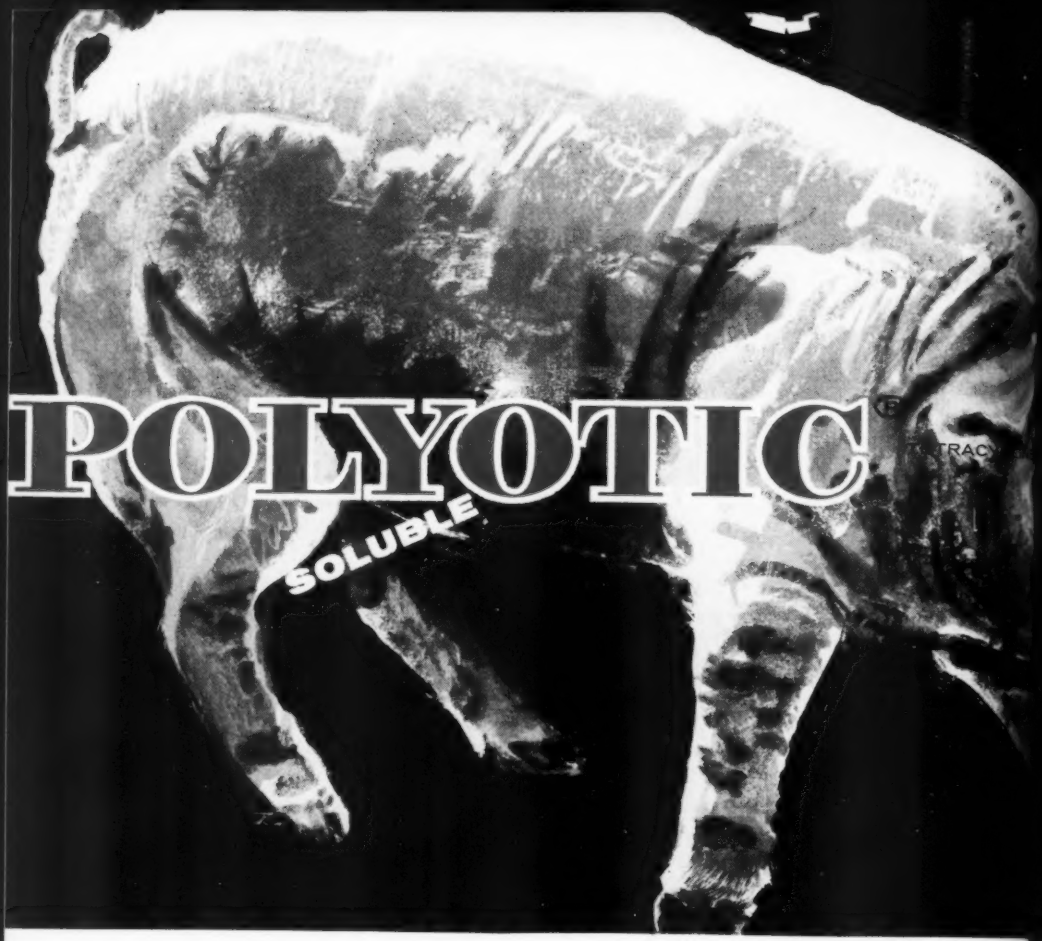
IMPORTANT NEWS: An exclusive new flavor ingredient has been added to Sterling Green'salt—to improve both its taste and odor. This flavoring, called "Sucarob,"* makes Green'salt fully palatable to all livestock—both mixed in feed or fed free choice. With it, livestock can now readily get the daily, low-level amounts of phenothiazine needed for worm control. "Sucarob" has been extensively tested—and results of these tests are available on request from International Salt Co., Inc.

**International's brand of carob flour. Pat. applied for.*

STERLING GREEN'SALT

Salt + 10% Pheno + Trace Minerals

Product of International Salt Co., Inc.
Scranton, Pennsylvania



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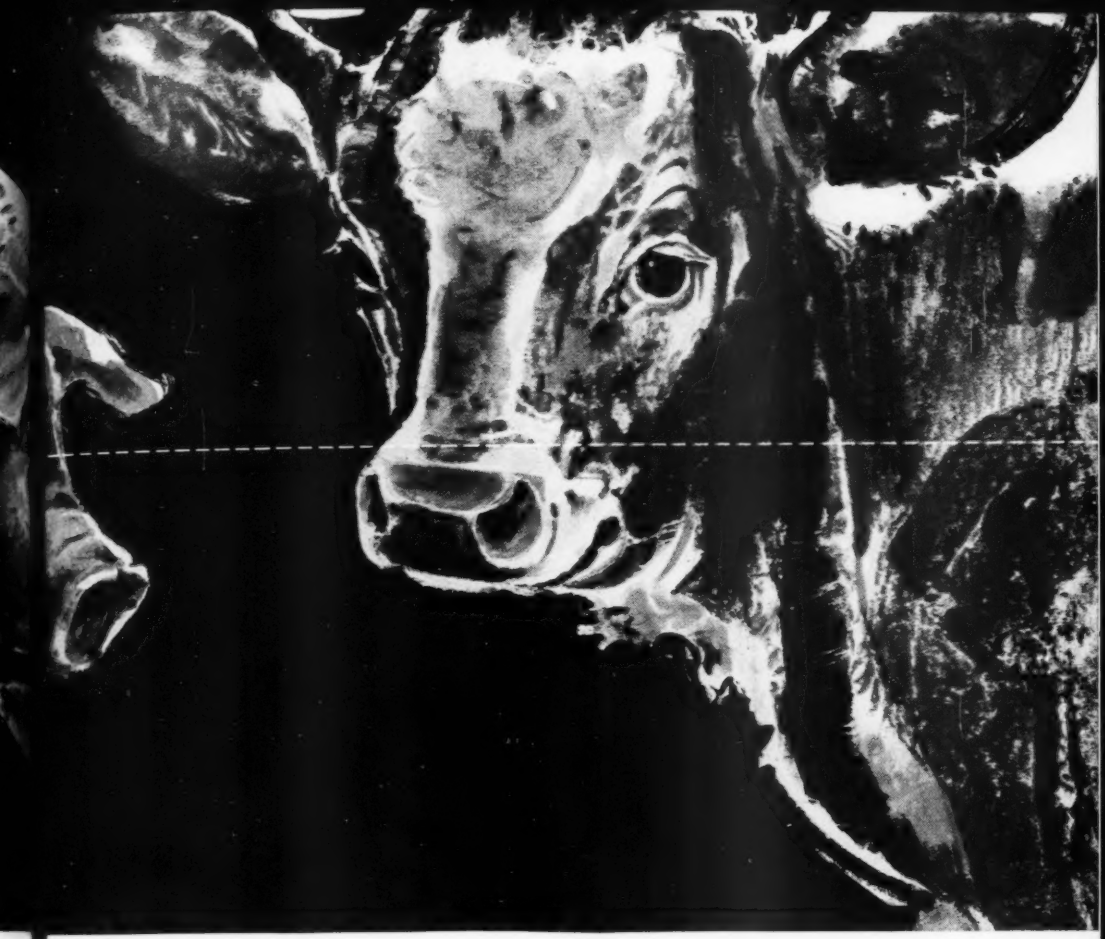

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ine use of this newest of the broad-
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lable in: 1/4-lb.; 1/2-lb.; 1 lb. and 5 lb. jars.

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LYOTIC OBLETS®: 4's-6 x 4's
LYOTIC CAPSULES: 50 mg., 25's-100's;
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0 mg., 25's-100's; 250 mg., 16's-100's
LYOTIC MASTITIS OINTMENTS ¼ oz.
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LYOTIC OPHTHALMIC OINTMENT 1%: 6 x ⅛ oz.
LYOTIC TOPICAL OINTMENT 3%: 1 oz.
LYOTIC SOLUBLE (Tinted) POWDER:
lb.-½ lb.-1 lb.-5 lb.
ANIZED® RABIES VACCINE: (Canine):
se-5 x 1 dose-10 doses
RABIES VACCINE: (Cattle): 10 doses

AVIANIZED CANINE DISTEMPER VACCINE:
1 dose-10 x 1 dose
ANTI-CANINE DISTEMPER SERUM AND ANTI-INFECTIOUS CANINE HEPATITIS SERUM: 20 cc., 100 cc.
INFECTIOUS CANINE HEPATITIS VACCINE: 2 cc.-10 cc.
BRUCELLA ABORTUS VACCINE: 1 dose-5 x 1 dose-5 doses (25 cc.)
FELINE DISTEMPER VACCINE: 1 immunization (2 vials Vaccine, 2 vials Sterile Diluent, 2 cc.)
ANTI-FELINE DISTEMPER SERUM: 50 cc.
CARICIDE® Diethylcarbamazine TABLETS:
400 mg., 25's
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A highly dispersible drinking water additive formulated for use in combatting necro-black scours, vibrio dysentery, bloody diarrhea, bacillary infections and shipping fever in swine; chronic respiratory disease, laying slumps, blue comb and weight losses in fowls; coughing, calf scours, pleurisy, shipping fever, bacillary dysentery and bronchitis in calves.

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Streptomycin Sulfate (as base)	3.0 gms.
Riboflavin	400.0 mgs.
Calcium Pantothenate	600.0 mgs.
Niacin	1,400.0 mgs.
Vitamin B_{12}	1,000.0 mcgs.
Vitamin A (palmitate oil)	100,000 U. S. P. Units
Vitamin D_3	100,000 I. C. Units

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Manganese Sulfate	280 mgs.
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Iron Sulfate	3 gms.
Copper Gluconate	300 mgs.
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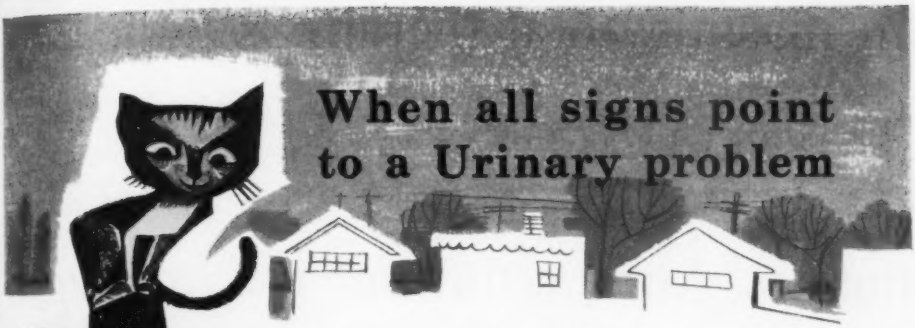

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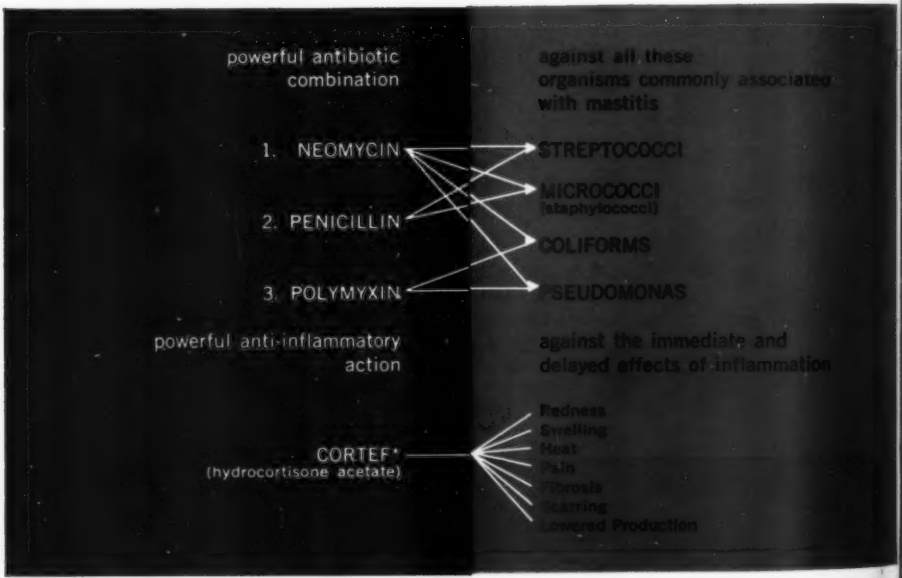

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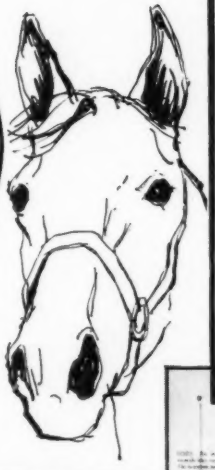

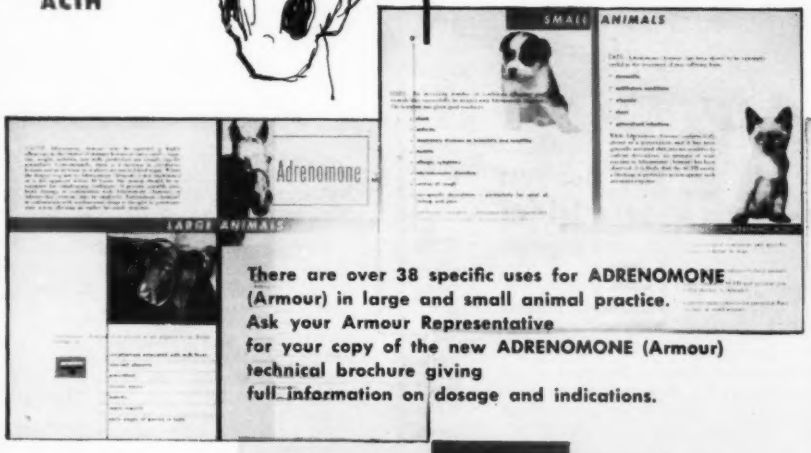

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MEETING CALENDAR

United States Livestock Sanitary Association, 60th annual convention, Hotel Morrison, Chicago, Ill., Nov. 28-30, 1956. Dr. R. A. Hendershott, 33 Oak Lane, Trenton 8, N. J., secretary.

Kentucky Veterinary Medical Association. Winter Meeting. Phoenix Hotel, Lexington, Ky., Dec. 10-11, 1956. Robert H. Singer, 136 Shawnee Place, Lexington, Ky., secretary-treasurer.

New York State Veterinary College. Forty-ninth Annual Conference for Veterinarians. Cornell University, Ithaca, N. Y., Jan. 2-4, 1957. W. A. Hagan, dean.

University of Pennsylvania. Fifty-seventh annual conference for veterinarians. College of Veterinary Medicine, University of Pennsylvania, Philadelphia, Pa., Jan. 8-9, 1957. Dr. M. W. Allam, dean.

Wisconsin Veterinary Medical Association. Forty-first Annual Meeting. Schroeder Hotel, Milwaukee, Wisc., Jan. 9-11, 1957. B. A. Beach, 1215 Vilas Ave., Madison 5, Wisc., secretary.

Indiana Veterinary Medical Association. Seventy-third annual Convention. Hotel Severin, Indianapolis, Ind. January 16-18, 1957. Dr. L. M. Borst, 3315 Shelby, Indianapolis, Ind., secretary.

Michigan State University. Thirty-fourth annual Post Graduate Conference for Veterinarians. College of Veterinary Medicine, Michigan State University, East Lansing, Mich., Jan. 22-23, 1957, C. F. Clark, dean.

Iowa Veterinary Medical Association. Annual Meeting. Hotel Fort Des Moines, Des Moines, Iowa, January 22-24, 1957. F. B. Young, Waukee, Iowa, secretary.

North Carolina Veterinary Conference. Nineteenth Annual Meeting. North Carolina State College, Raleigh, N. C., Jan. 22-25, 1957. C. D. Grinnells, State College, Raleigh, N. C., chairman, Conference Committee.

Maryland State Veterinary Medical Association. Winter Meeting. Lord Baltimore Hotel, Baltimore, Md., Jan. 23-24, 1957. John D. Gadd, Cockeysville, Md., secretary-treasurer.

Virginia Veterinary Medical Association. Annual meeting. Hotel John Marshall, Richmond, Va., Jan. 27-29, 1957. W. B. Bell, 1303 Hillcrest Drive, Blacksburg, Va., secretary-treasurer.

California State Veterinary Medical Association. Midwinter Conference. School of Veterinary Medicine, University of California, Davis, January 28-30, 1957. Charles S. Travers, 3004 16th Street, San Francisco, Calif., executive secretary.

Minnesota State Veterinary Medical Society. Annual Meeting. Radisson Hotel, Minneapolis, Minn., February 4-6, 1957. B. S. Pomeroy, Minnesota School of Veterinary Medicine, St. Paul 1, Minn., secretary-treasurer.

Illinois State Veterinary Medical Association. Seventy-fifth Annual Convention. LaSalle Hotel, Chicago, Ill., Feb. 25-27, 1957. C. B. Hostetler, 1385 Whitcomb Ave., Des Plaines, Ill., executive secretary.

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REFERENCES: 1. Blount, W. P.: Vet. Rec. **67**:1087 (Dec. 10) 1955. 2. Pate, D. D.: Southeast Vet. **6**:22 (Winter) 1955. 3. Smith, H. W.: J. Comp. Path. **65**:55 (Jan.) 1955. 4. Titkemeyer, C. W., and Schmittle, S. C.: Abstracts 45th Ann. Meeting Poultry Sc. Ass., Raleigh, N. C., Aug. 7-10, 1956, p. 49.

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George A. Blohm, Des Moines, Iowa, ISC '24, June 4, 1956.

Thomas O. Booth, Springtown, Texas, KCV '16, Aug. 9, 1956.

Otis G. Button, Tacoma, Wash., WSC '16, June 1956.

Vincent G. Bromwell, Center Point, Iowa, ISC '18, July 15, 1956.

Cornelius Cann, Frankfort, Ky., CVC '91, Aug. 16, 1956.

Lawrence C. Daugherty, Sheridan, Ark., IND '04, June 22, 1956.

Warren B. Earl, Reno, Nev., GWU '12, Aug. 18, 1956.

James C. Exline, Santa Barbara, Calif., MCK '05, July 14, 1956.

Lawrence Finney, Georgetown, Ill., MCK '12, Aug. 2, 1956.

John R. Friedline, Sarasota, Fla., GR '16, May 1956.

John F. Hemphill, Clay Center, Kans., KCV '07, July 11, 1956.

Floyd A. Logan, Marine City, Mich., ONT '14, died recently.

William E. Logan, Fort Worth, Texas, COL '21, July 21, 1956.

James E. Lovejoy, Augusta, Ga., USC '09, died recently.

G. P. Mayer, Lansing, Mich., CVC '16, July 28, 1956.

L. W. McEachron, Geneva, Nebr., KCV '05, Aug. 8, 1956.

Alexander T. McIntyre, Brown City, Mich., OVC '12, July 11, 1956.

Thomas Moore, Hull, Que., ONT '29, May 27, 1956.

Oscar W. Nelson, Westwood, N. J., UP '05, died recently.

J. M. Newby, Mount Hamill, Iowa, CVC '10, July 31, 1956.

Herbert Pew, Niobrara, Nebr., KCV 06, June 26, 1956.

Jesse L. Roberts Jr., Athens, Ga., GA '56, June 10, 1956.

Ray S. Robinson, Pierre, So. Dak., MCK 14, July 14, 1956.

Joseph F. Roser, Maysville, Kans., AVC '94, April 14, 1956.

Archie L. Schenck, Butler, Pa., GR 18, July 13, 1956.

John P. Simons, Ottumwa, Iowa., CIN '10, Sept. 3, 1956.

Lloyd J. Smith, Fairbury, Nebr., KCV '15, July 3, 1956.

Lee C. Songer, Olathe, Kans., KCV '03, May 21, 1956.

Alfred P. Thomas, Columbus, Ga., CVC '11, June 9, 1956.

Charles F. Van de Sand, Kiel, Wisc., CVC '15, March 8, 1956.

Leunis Van Es, Lincoln, Nebr., ONT '93, Aug. 27, 1956.

Arthur L. Warth, Garnett, Kans., WES '08, April 24, 1956.

William D. Warmoth, Macon, Mo., KCV '10, March 26, 1956.

Patrick J. Wilkinson, Oconomowoc, Wisc., CVC '94, March 8, 1956.

Perry Zenor, Sioux City, Iowa, CVC '06, June 4, 1956.

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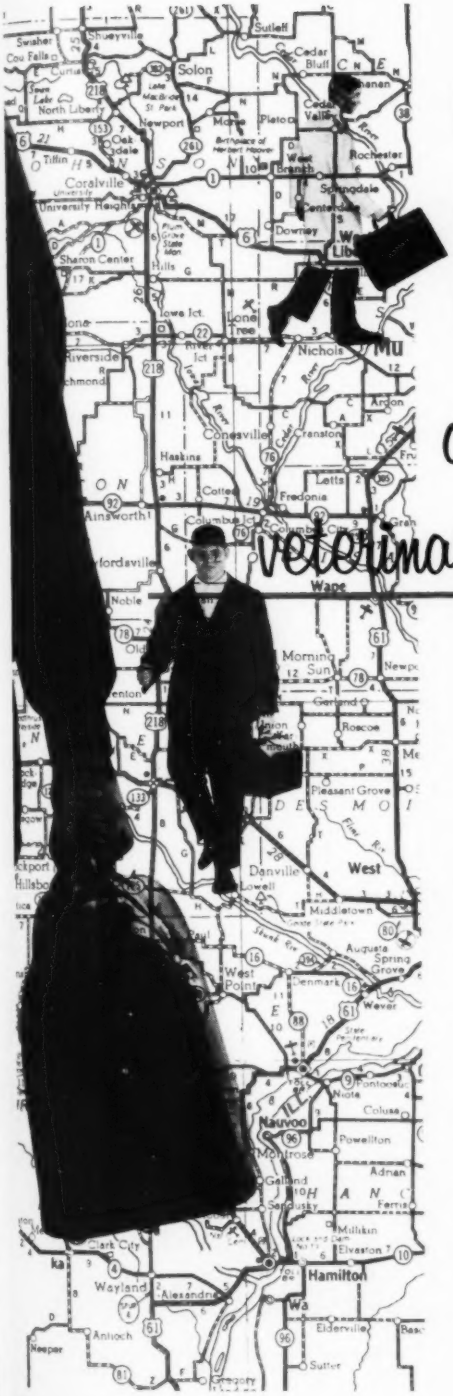

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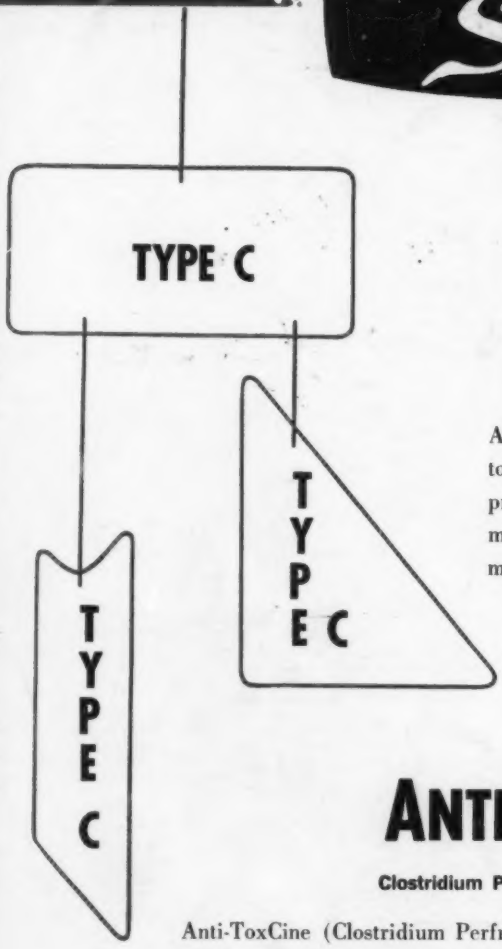

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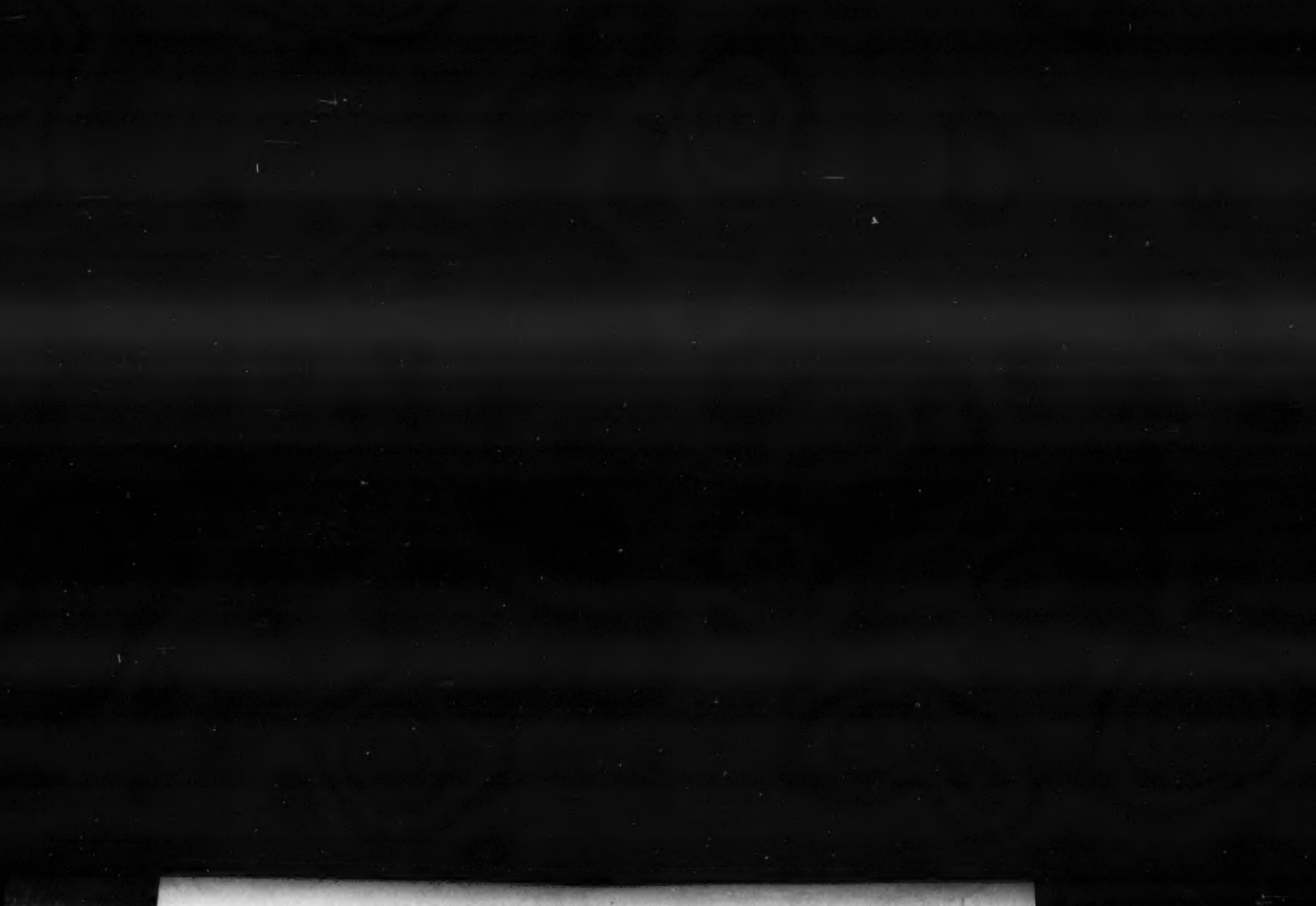
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